INVESTMENT AND GROWTH, TECHNICAL CHANGE AND FOREIGN CAPITAL IN GREEK MANUFACTURING INDUSTRY : 1953 - 1966

A Thesis Submitted in Partial Fulfilment of the Requirements for the Award of the Degree of Doctor of Philosophy at the University of Warwick

by

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B.Phil. (York)

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To my father

who inspired all this

ACKNOWLEDGEMENTS

The work described in this thesis was carried out when the author was a graduate student in the School of Economics of the University of Warwick and completed in December 1973.

The author wishes to express his gratitude to Professor A.G. Ford, who supervised this work and whose constant guidance and encouragement made its completion possible. The author also wishes to thank Professor J.R. Sargent and other members of the staff of the School of Economics in Warwick who granted me much of their time for discussions and advise.

The School of Economics provided facilities necessary for the research and the Library and University Computer Center granted their fullest cooperation.

My wife Lyda has assisted me considerably in the long statistical work involved in a thesis like this and the compilation of the final draft, and extended her sympathy in the period of inevitable stress that my work had upon our married life.

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CONTENTS

ABSTRACT

The particular circumstances of the development of the Greek economy are set in a historical context, as a general framework for the analysis of the developments in the manufacturing industry. The war-time and post-war destructions are set against the high post-war assistance and the limitations of the economic set-up are related to the rôle of foreign finance.

The period of advancement of the economy 1953-1966 is generally seen in relation to institutional and other factors of advancement. The factors directly affecting the performance of the manufacturing industry are described in some detail. The importance of savings to finance capital formation and the balance of payments problems of the growing economy are also discussed with particular emphasis on a detailed analysis of the balance of capital movements in all their forms, as an introduction to the analysis of the contribution of foreign capital in the growth of the economy in general and the manufacturing industry in particular.

The effects of the inflow of foreign capital into the manufacturing industry from the balance of payments point of view are examined after time series of direct investments are established by research in unpublished material of the Bank of Greece, which also gives us valuable insight into the outflow of funds accompanying this inflow. Import substitution policies related to this capital inflow are then examined in connection with interindustry relations, as backward and forward linkage effects are analysed for the establishment of "key industries". The total (direct - indirect) import content of foreign investment concludes the balance of payment effects of the inflow.

In the next part the effects of the inflow of foreign capital are seen in relation to productivity increases and technological advancement. Consistent time series of investment and net capital stock, adjusted for underutilised capacity are then constructed and together with estimates of the la-

bour input and of the factor shares are used in a production function from which we derive the residual factor of technological change by industry. Foreign investment is then related to those changes in productivity and in technology and to the structure of the labour market in Greece.

The structure of the particular industries is then discussed in some detail and the overall contribution of foreign capital is finally assessed with particular reference to the prospects of further development by branch of the industry and to the technological requirements in each case.

" Ξενικωτέρας γάρ γενομένης τῆς βοηθείας τῷ εἰσάγεσθαι ὧν ἐνδεεῖς καί ἐκπέμπειν ὧν ἐπλεόναζον, ἐξ ἀνάγκης ἡ τοῦ νομίσματος ἐπορίσθη χρῆσις ".

'Αριστοτέλης

Πολιτικά. Α' 3,13

CHAPTER ONE

The Greek Economy : A Historical Background

Greece is a small country distressed in its recent past by poverty, wars and internal strife. Yet the Greeks are singularly aware that long before they achieved an exclusive political identity as an independent state in more recent times, the nation occupied a distinguished cultural and political position in the world. The stamp of the ancient Aegean, Greek, and Hellenistic civilizations has never been erased, and there are living historic memories of the Greek empire of Byzantium, heir to the Graeco-Roman imperial legacy and to the Helladic Early-Christian tradition, guardian of the true faith, and for a millennium perhaps the most powerful and certainly the most civilised state in Europe or the Mediterranean world. The downfall from a leading place in the world since the days of the fourth crusade Latins, and the final fall of Constantinople to the Ottoman Turks in 1453, led to the eventual emergence of the weak little kingdom of modern Greece one hundred and fifty years ago, a country of limited boundaries and resources immediately dependent on foreign funds and expertise for its survival. But despite this dependence on foreigners, the historical heritage of the past has exercised a considerable influence in shaping the political and social attitudes of modern times in the Greek effort to assess the national identity and establish a viable political and economic unit.

The aspirations that the Greek milieu inspires have often stirred support for the Greek cause abroad, and the London Committees of philhellenes at the time of the 1821-29 revolution against the Ottoman Turks reflected the appeal of such past glories not only

to romantics and idealists, but also to realists: not only to Byron, Shelley and J. Bentham, but to David Ricardo as well. Ironically briefly subscribing to collections for funds to finance relief for the Greeks was the Earl of Elgin, notoriously remembered for his earlier "dilapidating mania."

The first British bank loans in 1824-25 were a very sorry tale indeed. Granted only after painful negotiations and hesitations, they amounted to £800,000 (some $ 20 m. in todays values), with an annual interest of £40,000 at a time when the annual public revenue of the country was less than £80,000. The Greeks received only about one-third of the nominal value, some £300,000 in the end, part of the rest accruing to some of the London Greek Committee members themselves, who made personal profit out of the contracts for the loan.(1) Whatever found its way to Greece was in turn generally misused by the Greeks with few exceptions.

So started the story of the Greek international indebtedness, which was only aggravated throughout the 19th century, as the Greek state with the extremely restricted frontiers imposed upon it at that time was hardly a viable economic proposition. By 1897 internal and external misfortunes forced a practically bankrupt state to accept a receivership of the major lending powers, an International Finance Commission taking over the collection of certain taxes to guarantee the service of the loans.

The failure of the Asia Minor campaign in 1922 after a decade marked by successful national endeavours and marred by discord, brought about the foundering of the romantic "Grand Idea" of liberating all Greeks under Ottoman rule and rebuilding the medieval

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(1) C.M. Woodhouse: The Philhellenes. Hodder and Stoughton, London, 1969, pp. 73, 91.
George Finley: History of the Greek Revolution, W. Blackwood, Edinburgh, 1861, Vol. I.
George Finley: A History of Greece from its Conquest by the Romans to the Present Time. Clarendon Press, London, 1877, Vol. VI. Part 1.

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Byzantine state of Constantinople, and undermined the traditional solidarity of the Greek society. The influx of about 1.5 million refugees deported by the Turks from their ancestral homes in Ionia during the first world war and after 1922, in addition to many others deported from Bulgaria, the Russian Caucasus, Rumania, etc., resulted in an increase in economic activity in Greece proper to accommodate them.(1) The impact of the disaster was crucial for the Greek economy, which started recovering slowly in the face of enormous political, social, and economic problems far outstripping the capacity of the impoverished country. The skills of the resettled refugees and the overall reaction of the society to the adverse conditions contributed substantially to a change in the orientation of the economy and helped establish the pre-conditions for the "take-off" period of industrialisation and expansion. This latter phase was considerably delayed, nevertheless, because of the 1931 world economic crisis and the uneasy political developments before the outbreak of the second world war, and was only resumed in the early fifties after the end of the civil strife to which Greece was subjected at the end of the war.

The advent of the war in Europe in September 1939 did not immediately affect Greece, but resulted in a sudden increase in the monetary circulation in the country from 8 to over 10 million drachmas. The rush on deposits soon came under control, nevertheless, and despite some price increases, production, supplies, and trade were affected only moderately. But late in 1940 the axis powers started their offensive against the uncommitted countries in south-

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(1) Xenophon E. Zolotas: Greece at the Stage of Industrialisation, (in Greek), Athens, 1926, Reprinted by Bank of Greece, Economic Research Direction, Athens, 1964.
Adamantios Pepelasis: "Greece", Pepelasis, Mears, Adelman, Eds., Economic Development: Analysis and Case Studies, Harper and Row, 1961, p. 509 ff.
International Labour Office: Labour Problems in Greece, Geneva, 1949, pp. 20-28.

east Europe, following the early success of their campaign against Western and Northern Europe. Italy, unprovoked, invaded Greece on October 28, 1940 on the mountains of Epirus before the expiry of an unacceptable humiliating ultimatum. A moratorium on bank deposits was imposed in Athens and there was a remarkable currency stability for the period of the astonishingly successful and victorious Greek counterattack operations which carried the war into Albania. Some part of the expenses of the war were born by the British government, which gave loans for supplies outside the sterling area plus a monthly loan of £5m., to help stabilise the economy.(1)

Six months later a combined attack of Italy's axis allies through Bulgaria behind the Greek defence lines overcame the Greek and small allied expeditionary units from Britain and the antipodes and cleared ferocious resistance in the island of Crete in the costliest German air-born operation of the war.(2) The Russian campaign had to be postponed for two months until well into the summer, and the delay proved critical in the early winter that followed. Despite specific defence pacts with Greece, Turkey remained conspicuously neutral during the war and even discriminated against Greek property and businesses in Constantinople by savage taxation amounting to piecemeal expropriation.

Years of active resistance and internal strife followed the occupation, holding many German divisions in garrison, sometimes in full-scale operations against the guerillas.(3) By the end of the war Greece had suffered proportionally more than any other allied nation, with the possible exception of the German-occupied

(1) Wrav O. Candilis: The Economy of Greece, 1944-66. Praeger, New York, 1968, pp. 11-13.
(2) John Campbell and Philip Sherrard: Modern Greece. Ernest Benn Ltd., London, 1968, pp. 166-173.
C.M. Woodhouse: The Story of Modern Greece. Faber, London, 1968.
(3) C.M. Woodhouse: Apple of Discord. Hutchinson and Co. Ltd., London, 1948.

part of Soviet Russia, as was established in the Paris Conference of Reparations in October 1946. The devastation of the already poor economy was unprecedented. Not only was the country dismembered, but nearly 400,000 buildings, one fourth of the total, were demolished during the operations, sometimes to build fortifications and airfields or in retaliation; a large number were simply wiped out in air raids. Thousands of villages were burned to the ground, sometimes with parallel execution of the entire population. About one million homeless refugees drifted into the urban centres, already congested by the large sudden influx of refugees in the twenties.(1) The population of Athens more than doubled from 1941 to 1944 and that of Thessaloniki tripled.

All capital equipment that was worth removing was taken. Only 14 per cent of all vehicles survived in a bad state; all tractors and agricultural equipment was confiscated; the railway system simply ceased existing altogether. Nearly all roads, bridges, tunnels and mountain passes were blown up and the communication lines were wiped out. The Corinth Canal was blown up and blocked by millions of tons of rock and rubble. All harbours were methodically destroyed, some perforce by the allied airforce to hold up German supplies to Rommel's Africa Korps. The merchant fleet, once the economy's most important and vigorous sector, lost three quarters of its total tonnage, most of the ocean-going steamers sinking when carrying vital allied supplies in Atlantic convoys. Nearly 5,000 Greek seamen were lost with them.(2)

The agricultural production in the years 1941-44 declined by 50 to 90 per cent as compared with the pre-war level depending on the commodity, with a parallel decline in the area of cultivated

(1) H.R. Wilkinson: Maps and Politics: A Review of the Ethnographic Cartography of Macedonia, Liverpool University Press, 1951, pp. 300-303.
(2) The Statist, May 5th, 1945.

land. Animal breeding practically ceased existing as most of the larger animals were commandeered for provisioning the occupation forces.(1) Most forests and woods near roads and towns were burned down for the fear of guerilla attacks or to provide timber to Germany and its allies: an irreparable destruction of between one quarter and one third of the country's limited forest wealth. More than two million olive trees and 60,000 acres of vineyards were also lost, aggrevating the old process of erosion and soil depletion, particularly on the sloping hill terrains.(2)

The small agricultural and mineral wealth was requisitioned in return for useless credit balances or "occupation currencies", and all conceivable "advances" and "indemnities" were extracted from the nation. The public finances were in a sad state, the treasury empty, the credit facilities completely inoperative. Imports in a country depending for its survival on food imports fell to only 6 per cent of the pre-war level, exports sometimes as low as 3 per cent, excluding exports of requisitioned goods. The human suffering because of heavy war damages was accentuated in the famine of winter 1941-42, when many thousands of people were dying of malnutrition and disease in the streets of Athens.

A continuous acute inflation and a widespread underground "black market" followed the disruption of the economy, not only during the occupation but after the end of it as well, to a degree unprecedented in any other occupied country, reflecting the economic collapse of the nation and virtually putting the economy on a barter basis. Rampant gold hoarding was the result of the uncontrolled depreciation of the drachma. Well over one million and

(1) K. Doxiadis: Devastation in Greece, Keliher, Hudson and Kearns, Ltd., London, 1945, p. 4 ff.
B. Sweet-Escott: Greece, A Political and Economic Survey, Royal Institute of International Affairs, London, 1954, p. 97 ff.

(2) International Labour Office: Op.cit., pp. 28-29.
A.I. Sbarounis: Studies and Reminiscences of the Second World War (in Greek), Athens, 1951.

a half persons (over 20 per cent of the population) were still officially classified as "indigent" as late as 1947, well after the end of the war in Europe, with an income of less than $ 2.50 a month.(1)

The physical destruction and the tragic loss of human life unfortunately continued and were in fact sometimes accentuated during the period of civil strife, which was already under way even before the withdrawal of the German troops in September 1944 and aggravated the deplorable social conditions inevitable under such a disorganised economic structure. The devastation continued long after the December 1944 abortive communist takeover attempt until the end of 1949. The Iron Curtain was drawn along the northern frontiers of Greece, and what in Europe was a "cold war", was in Greece a very real one.(2) The nation's material losses in that period were assessed at 3,686 m. drachmas. Eighty-five per cent of all the 1948-52 Marshall Plan aid was spent merely to restore damage .

The Paris Conference of Reparations in 1946 was another cause of indignation in Greece. Against war losses, occupation expenses and physical destruction very moderately estimated at $ 8,500 m., German reparations were ruled out in the forseeable future.(3) The question of return of Greek art treasures, amassed by systematic German depredations over the previous century or so against the Greek cultural inheritance was, not surprisingly, not even discussed by the allies. The costs of the Albanian campaign and the Italian

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(1) Wray O. Candilis: Op.cit.. p. 17 ff.
(2) William Hardy McNeill: The Greek Dilemma, War and Aftermath, J.B. Lippincote, New York, 1947.
(3) D.D. Psilos and R.M. Westebbe: Public International Development Financing in Greece. Columbia University School of Law, New York, September 1964, p. 2.
International Labour Office: Op.cit.., pp.28-9.

occupation alone were estimated at more than $ 2,500 m., but again a symbolic Italian compensation of only $ 100 m. phased over a very long period of time was granted by the conference. The Bulgarians who transformed overnight from a formation of the Nazi occupation forces to an ally of the Soviets at the end of the war, and the Albanians, Italy's allies in the invasion, escaped all consequences. A minimal symbolic reparation was nominally agreed upon with Bulgaria in 1964 in settlement of outstanding debts coupled with Bulgarian access to the Thessaloniki port in return, and the Albanian state that emerged after the war still includes within its southern boundaries the Greek-populated Northern Epirus which was expected to be incorporated into Greece at the peace settlement. Finally Cyprus, with its 82 per cent Greek majority population was not allowed to exercise its natural option for self determination and enosis with Greece: a fateful mistake with many unfortunate implications in the years that followed.

Industrial production was predictably low in the immediate post-war years, rising from one-third of the pre-war level at the end of 1945 to two-thirds at the end of 1947. Mining only amounted to 14 per cent of the pre-war level by that time. Much of the existing machinery was of German origin with spares and replacement parts generally unavailable. The industry was producing for a reduced home market and the traditional central-European markets were lost.

The growth rate of the economy was by necessity sluggish. Positive private savings in the economy only occur in the year 1949 and afterwards. Before this year consumer expenditure on goods and services exceeded the national income and was therefore taking place at the expense of the capital stock.(1) Even after that time

(1) National Statistical Service: National Accounts of Greece. X:2, No. 21, Athens, May 1972, pp. 42, 48.
National Statistical Service of Greece: Statistical Summary of Greece. Athens, 1954, p. 180.

private savings were only small as compared with the private consumer expenditure. Government savings were also negative, and this deficit on the current account continued until 1953, when we first observe positive entries. The negative or narrow savings were inadequate to support the required rate of investment, and inevitably came as an obstacle to a high rate of capital formation for development. Clearly the economy would have to count on massive foreign finance for any chance of recovery. In fact foreign resources financed the greater part of net investment; domestic savings mostly financed replacements. The investment fluctuations followed the pattern of foreign aid receipts and after the year 1951-52 when foreign aid was reduced, absorption declined and investment alone accounted for 75 per cent of the decline.

The deficiency in savings was partly due to the undermined foundations of the financial system of Greece. The liquidity of private individuals and business concerns was wiped out by the first monetary reform at the end of the war, which eliminated all bank savings as well.(1) People turned to English gold sovereigns not only for hoarding but for exchange in large transactions. As much as half the amount of money in circulation in the late forties may have comprised of gold sovereigns. The use of gold as a store of value during the war and after the end of it was one of the results of the general lack of confidence in the drachma.(2) This lack of confidence also resulted in capital flight through leaks in the exchange controls. The banks could only distribute credits allotted to them by the Bank of Greece. Interest rates reached levels as

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(1) D.J. Delivanis and W.C. Cleveland: Greek Monetary Developments, 1939-1948. Indiana University Publications, Bloomington, Indiana, 1949, p. 105.

(2) Kyr. Varvaressos: Report to the Greek Government on the Greek Economic Problem, (In Greek), Athens, 1952, p. 156. English mimeograph, Washington, February 1952, p. 156.

high as 30 to 40 per cent. The supply of money between 1948 and 1951 increased two-and-a-half times and the retail prices were 500 times the pre-war level. Wages and salaries lagged behind prices and the failure of the rationing and price fixing policies of K. Varvaressos, Minister of Supply in early 1946, coupled with uneasy developments in the civil strife, resulted in inflation cutting into fixed wages, a scarcity of goods, rising black-market prices, hoarding of gold or tangible stocks, minimisation of constructive investment, continuing unemployment and strikes.(1)

The monetary reform of November 1944, the first after the liberation introduced an exchange rate of 149 drachmas per U.S. dollar. The drachma was devalued again in June 1945 to 500 drachmas per dollar, with a parallel liberalisation of foreign exchange dealings. A third major monetary reform, named Anglo-Hellenic Convention, in January 1946 introduced a new parity at 5,000 drachmas to 1 dollar.(2) The restriction of UNRRA aid at the time and the general exhaustion of the economy because of the civil war precipitated its failure, and a new complicated system of "exchange certificates" was introduced in October 1947. Retention quotas and negotiable import rights were allowed and the certificate indicated the amount of export proceeds surrendered to the Bank of Greece. It was given to importers who were required to pay the official rate for foreign exchange needed, plus an equivalent amount in exchange certificates.(3)

The effective exchange rate of the drachma to U.S. dollar in June 1948 was 10,000 to 1. The devaluation of the pound sterling in September 1949 caused an additional 33.3 per cent devaluation.

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(1) X. Zolotas: Monetary Equilibrium and Economic Development, Princeton, New Jersey, Princeton University Press, 1965, p. 33 ff.
(2) W.O. Candilis: Op.cit., p. 32 ff.
(3) For the nature and causation of the "exchange certificates" see Raymond F. Mikesell: Foreign Exchange in the Post-War World, New York, The Twentieth Century Fund, 1954, p. 299 ff.

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The effective rate was now 15,000 to 1.(1) Multiple exchange rates prevailed at the same time, as different rates of exchange taxes and export subsidies were employed, bringing the effective rate for a number of exports to a range of 3,600 to 47,000 drachmas per dollar. The combination of devaluations and controls resulted in only brief periods of improvement.(2)

It should be noted that without very substantial foreign aid, starvation and general economic and political collapse would have been inevitable. Over the period October 1944/June 1947 a total of $ 152 million British aid was granted to Greece. An additional $ 76 million remained as the balance of the 1940-41 British loans to Greece. Further British contributions came as UNRRA relief supplies. A British loan granted for the purpose of currency stabilisation and representing a deposit of the Bank of England, accounted for half the $ 86 million foreign exchange reserves of the country on February 1947. An additional transfer of $ 49.2 million for British military authority notes issued in Greece and drachma advances by the central bank to British military personnel was later offset by Greek obligations netting only $ 2 million equivalent, used for Greek imports from the sterling area.(3)

By March 1947 the U.S. aid programme increased drastically following the Truman Doctrine and the Marshall Plan proclamations, and the high-level assistance on the economic and military front continued until 1951, with a considerable reduction in 1952 and further drastic cuts thereafter. Foreign assistance in the years

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(1) Evangelos Eliades: "Stabilisation of the Greek Economy and the 1953 Devaluation of the Drachma", IMF Staff Papers, September 1954, p. 36 ff.
(2) Marina Goudi: "Adjustment of the Price of Foreign Exchange", Review of Economic and Political Sciences. (In Greek), Athens, April-September 1953, p. 206.
(3) D.D. Psilos and R.M. Westebbe: Op.cit., p. 35.

between 1947-53 amounted to $ 1,600 million, i.e. about 25 per cent of the Greek National Income during the post-war years. The foreign exchange earnings from exports were only about 25 per cent of the imports of goods and services in 1950 and about 33 per cent in 1951.(1)

By 1952, three years after the end of the ten-years-long war period, the national income returned to the prewar level.(2) The economic infrastructure in terms of administrative, institutional, and technical capacity was inadequate and lacked rational organisation. Regional variations in the distribution of income were acute, with the Athens areas having a per capita income nearly five times higher than the lagging poor mountainous communities. Underemployment and unemployment were still very high, and the rate of investment sluggish. Government expenditure for goods and services amounted to roughly 20 per cent of total absorption. Since more than 60 per cent of the government spending on goods and services was on administration, defence and security, manipulation of expenditures could only take place in very restricted limits, and reduced investment outlays followed any fiscal stabilisation policy. Only three quarters of total government expenditure was financed by internal resources. War reparations and foreign aid filled in the gap.

Primary production accounted by the beginning of 1953 for 34 per cent and industrial production for 23 per cent of the Gross National Product. The primary production employed as much as 57 per cent of the total labour force. There existed an estimated

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(1) S. Poulopoulos: "Directions of Economic Policy", Review of Economic and Political Sciences. (In Greek), Athens, October-December 1952, p. 380 ff.
P.I. Eliopoulos: The Trade of Greece. 1930-1952. (In Greek), Athens, 1952, pp. 39-40.

(2) Bank of Greece: Report of the Governor for the Year 1953, (In Greek), Athens, 1954, pp. XX-XXI.
Hellenic Industrial Development Bank - ETBA: Greek Industry in Perspective. Athens, 1967, p. 13 ff.

650,000 to 800,000 surplus agricultural workers, 40 to 50 per cent above their normal number. The agricultural sector itself provided much of the extensive subsistence sector inherent in the dual character of the economic structure of less developed countries.(1)

With the exception of food industries and textiles, manufacturing industry did not exist in any viable form. Most industrial units were small-scale, low-productivity firms or handicraft establishments under the protection of tariffs up to 50 per cent ad valorem, producing light consumer and investment goods serving construction and agriculture in the protected domestic market, and mainly confined to the last stages of processing.(2) Labour force leaving farms was absorbed in various services, since the industry could not provide occupations. This resulted in one quarter of the labour force in the service sector, producing 42 per cent of the gross national product.

The 1949-53 period was mainly a period of rehabilitation and reconstruction, of rallying forces and bringing the economy to the take-off stage of economic development: a period of recovery rather than development, when the weakness of the institutional framework of the state in terms of administrative, educational, and legal system, together with the weakness of the political setup in terms of efficiency, often hindered social change and progress and the rapid material advancement of a country, if no longer desperately poor, still on the threshhold of swift and sustained economic progress.

(1) A.P. Kouklelis: "Increase in Per Capita Income and Investment Priorities", Review of Economic and Political Sciences, (In Greek), July-December 1954, p. 225 ff.
Institut National de la Statistique et des Études Économiques: Memento Économique - La Grèce. Ministère des Finances et des Affaires Économiques, Presses Universitaires de France, Paris, Serie M6, 1952, p. 234 ff.

(2) Bank of Greece: The Greek Economy in 1955-56, Athens, 1957, p. 154. Federation of Greek Industries: The State of Greek Industry in 1954-55, Athens, 1956, Appendix Table G'.

CHAPTER TWO

The Expansion of the Economy. 1953-1966: A Framework for the Expansion of Manufacturing Industry

A'. The Institutional Changes

It is generally accepted that the year 1953 marks in many ways, structurally and institutionally the beginning of development of the Greek economy in terms of effective industrial expansion, monetary stability, and consistent effort for free development of foreign trade, the reconstruction of the country giving way to a second phase of more consistent planned development. Two significant events coincided with the beginning of this period and affected the course of developments, one political and one economic. Field Marshall Alexander Papagos the leader of the 1940-41 Albanian campaign and of the 1948-49 operations won a resounding electoral victory in November 1952 with his Gaulist-inspired Greek Rally, ending the liberal-party coalition governments of the post-war period, and his minister of Economic Coordination S. Markezinis announced his decision to devalue the drachma by 50 per cent on April 9, 1953, to provide adequate safety margins for exports of goods and imports of capital. The exchange rate rose from $ 1 : 15,000 to $ 1 : 30,000 drachmas, and remained stable ever since.(1) In May 1954 a further monetary reform consolidated 1,000 old drachmas into 1 new drachma, facilitating transactions and enhancing the feeling of economic stability. The price of the U.S. dollar was now 30 renominated drachmas.

The balance of payments, it was generally agreed, was in fundamental disequilibrium before the devaluation, and was expected to

(1) Government Gazette: Ministerial Decision on Devaluation. Athens, April 9th, 1953.

deterioate further in 1953, despite a number of antiinflationary measures taken in the winter 1951-52, which brought about some temporary external and internal improvements.(1) Reliable estimates of the propensities to consume and of price elasticities were unavailable even in a crude form, and as a result all estimates of the degree of the disequilibrium of the exchange rate were based on the purchasing power parity doctrine.(2)

The ministerial decision on the devaluation abolished the multiple exchange rate system existing under the form of foreign exchange taxes and subsidies, therefore affecting individual commodities differently. Trade liberalisation was introduced and all quantitative controls were abolished in the belief that foreign competition, despite an element of risk for domestic development, would be an incentive for modernisation of the industrial sector. Export restrictions were also removed and liberalisation of invisibles took place later in the year. Those measures whilst eliminating the overvaluation of drachma prices prior to the devaluation, were expected to contribute at the same time to monetary stability, and with the release of "competitive forces" to enhance economic development and help allocate resources in a more efficient way. A parallel drastic reduction of government employees was enforced amounting to five thousand retirements.(3)

The restrictive deflationary measures and direct quantitative controls on credits kept the volume of money circulation at a fairly stable level and the increases in prices of goods did not match

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(1) X. Zolotas: "Devaluation, Inflationary Pressures and Investments" Review of Economic and Political Sciences. (In Greek), Athens, April-September 1953, p. 335.
P.I. Eliopoulos: Op.cit., p. 39.
(2) Marina Goudi: Op.cit., p. 210 ff.
D. Kalitsounakis: Applied Political Economy. (In Greek), Athens, 1957, p. 395 ff.
(3) K. Varvaressos: The Depreciation of the Drachma. (In Greek), Athens, May, 1953, p. 30 ff.

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the rise in the drachma price of gold sovereigns.(1) In the period to the end of 1953 the wholesale price index increased by 29 per cent in the Athens area, the retail price index by 22 per cent, and the cost of living index by only 19 per cent. The price increases in 1954 were much lower: 6 per cent for the wholesale index and 7.3 per cent for the cost of living index, with a parallel decline in the average propensity to absorb, probably because of the cash balance effect and the money illusion effect. By the end of 1954 price expectations pushed the propensity back to the predevaluation level. A shift in favour of domestic products through the substitution effect followed the increase in prices of imports.

Fiscal policies following the devaluation were a combination of reduced expenditures in real terms and a surplus of 19 million drachmas in the current account budget in 1953/54, and of 372 million in 1954/55. Government investments and services were reduced and salaries were adjusted only to a limited extent. Industrial employment declined slightly but industrial production in real terms increased by 5 per cent. Consequently productivity increased accordingly.(2)

Exports increased in the short-run period following the devaluation by about 27 per cent, given their comparative price advantage. But the increase covered only about one seventh of the enormous trade gap of 1952. By 1955 exports amounted to $ 206.5 million as compared with $ 115 million in 1952. They increased by a mere $ 3 million in 1956. The price incentive of the devaluation on exports had already largely disappeared by the end of 1955 due to shifts in foreign demand following changes in incomes abroad.

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(1) Bank of Greece: Report of the Governor for the Year 1953, Op. cit. p. XXXII

(2) Andreas Michalakis: "Fiscal Policy and Economic Development in Greece, 1952-62", Public Finance as an Instrument for Economic Development, Alan T. Peacock, Ed., OECD, 1964, p. 20 ff.

The inelastic demand for agricultural exports coupled with rising costs at home hampered any further improvement. A parallel shift in favour of domestic products through the substitution effect resulted from the increase in prices of imports after the devaluation. Imports in fact dropped by 15 per cent in value in 1953 but were above their 1952 level by the end of 1954.(1) They amounted to $ 364.8 million in 1955 as compared with $ 277.1 m. in 1952 after the anti-inflationary measures of 1951-52, and jumped up to $ 465.3 m. in 1956.

The variation in the exchange rate was expected to affect the capital inflows in Greece in a number of ways. The pre-1953 expectation of devaluation generally tended to discourage transfers which were not of the "induced" or "accommodating" type. All autonomous transfers (including the capital account transfers) were discouraged in the expectation of a devaluation, since they would be channeled to investment in assets with given prices and yields denominated in Greek drachmas, and there would be an exchange loss to the investor when his earnings or his capital would be converted at a less favourable rate.(2) The devaluation was additionally expected to change the valuation of given "real" transactions, i.e. the foreign currency proceeds of one drachma's worth of exports.(3) Price

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(1) G. Chalkiopoulos: "Income and Imports", The Balance of Payments Problem. (In Greek), Athens, 1958, p. 20 ff.
P. Tzannetakis: "Developments in the Balance of Payments", Ibid. p. 37 ff.
National Bank of Greece and Athens/Foreign Trade Direction: Problems of the Balance of Payments in Greece. (In Greek), Athens, March 1958, pp. 96-97.

(2) Rudolf R. Rhomberg: "Private Capital Movements and Exchange Rates in Developing Countries", IMF Staff Papers, Vol. XIII, No. 1. March 1966, p. 1 ff.
Fritz Machlup: "Three Concepts of the Balance of Payments and the Dollar Shortage", Economic Journal, March 1950, p. 46 ff.

(3) Paul Einzig: "Industry and Foreign Exchange", Industrial Educational and Research Foundation, Occasional Paper No. 5, Portland House, London 1969.

considerations were also expected to affect the cost of labour and materials in Greece with a decline in the event of a devaluation in the foreign exchange equivalent of the net revenue accruing to foreign investors in local currency. Wherever the construction of the asset depended on the price level in Greece, then the expectation of a devaluation led to postponements of the expenditure until finally the devaluation actually took place and lowered the expected dollar cost of the project. We note that only autonomous capital movements were reacting as described above, and not the accommodating transfers including foreign aid.

The devaluation itself was not a particularly important factor in attracting foreign capital in Greece, as precious little came in the immediate post devaluation period. It was important in the long-run in an indirect way, nevertheless, by enhancing the climate of economic stability and price stability which was favourable to foreign capital ventures. It brought about the stability preconditions necessary for the attraction of such ventures.

A number of political and other factors at the same time were also expected or calculated to contribute to the attraction of foreign capital. The Article 112 of the 1952 Constitution provided that "An Act once and for all shall regulate the protection of capital imported from abroad to be invested in the country". The Legislative Decree 2687/1953, "On Investment and Protection of Capital from Abroad" was introduced a year later in November 1953 to this effect.(1) This law affected the conditions of financing investment projects by providing incentives applying to productive investments, and creating permanent facilities and inducements for better

(1) Theodoros Kapsalis: Introductory Statement on the Draft Legislative Decree: Investment and Protection of Foreign Capital. Submitted to the Special Committee of Article 35 of the Constitution, Athens, October 9, 1953.

and more efficient use of existing resources. The law had special constitutional validity and could not be amended or repealed by ordinary law,(1) and covered all forms of foreign capital imported for investment in Greece, in foreign exchange, equipment, technical processes, and in the form of direct private capital imports, equity participation, or loans. Compulsory expropriation of approved investments was ruled out, and the amount agreed upon for any constitutional requisition could be remitted abroad. We note that although convertibility and expropriation guarantees were granted, war risk guarantees issued in many troubled countries including Israel were not considered necessary.(2) No insurance against currency depreciation, or against "creeping expropriation" through social and labour legislation, or controls on trade were considered either.(3)

The unattractive conditions which discouraged foreign private capital and which the L.D. 2687/53 tried to improve upon, were not characteristic of the Greek economy alone. Many foreign governments introduced "model" laws, only to be disappointed that foreign capital was not immediately attracted in any quantity.(4) Pakistan for instance reported its "keen disappointment" in the mid-fifties when only one large American industrial company responded to the

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(1) C. Lambadarios: Legal Aspects of Foreign Investment. W.G. Friedman, Ed., Boston, 1959, Ch. 15, p. 245 ff.
D.J. Evrigenis, S. Nestor, K. Ioannou: Some Aspects of the Legal Protection of Foreign Investments in Greece. Athens, 1963.

(2) Investment Guarantees Division, International Cooperation Administration, Office of Private Enterprise: Tables: Guarantees by Countries. Washington, D.C., January 25, 1961.

(3) Marina von Neuman Whitman: The U.S. Investment Guarantee Program and Private Foreign Investment, Studies in International Finance, No. 9, Princeton University Press, 1959.

(4) J.N. Behrman: "Promotion of Private Overseas Investment", U.S. Private and Government Investment Abroad. R.F. Mikesell, Ed., University of Oregon, 1962, p. 183 ff.

persistent efforts to attract foreign capital,[1] and their Council of the International Chamber of Commerce had complaints of similar nature in 1960. The Greek Council also felt that "there is a genuine reluctance on the part of private capital to invest in underdeveloped countries in spite of all guarantees and assurances given".[2]

Although it is not possible to determine conclusively the success or failure of the Greek investment-incentive programme (which is analysed in a later chapter in some detail), as we do not know what the record would have been in its absence, there is some evidence in several other countries suggesting the role of such legislation in promoting new investment ventures is sometimes overestimated.

(1) Stanford Research Institute: Stimulating Private Foreign Investment. Oct. 5, 1955. p. 38.
(2) International Chamber of Commerce: Document 111/99, April 27, 1960.

B'. The Economic Advancement

There was a remarkable rise in the level of net national income during the years that followed the devaluation and the introduction of L.D. 2687/1953: it increased by about 110 per cent in the 1953-66 period at constant 1958 factor cost prices, reflecting the increased rate of economic activity that characterised the country. Manufacturing industry output increased by 192 per cent in the same period.

Population trends show that the natural increase in population declined from an annual rate of about 1.5 per cent in 1953 to 0.8 in 1961 and 0.47 in 1965, mainly because of the increase in emigration. The population growth rate in the period 1951-1961, between the two population census years was 0.94 per cent p.a., but dropped around the 0.50 per cent level in the period 1961-1966. This is associated with a per capita income increase of nearly 100 per cent over the period. The pre-war level was reached by the middle-fifties, and the actual level reached an estimated $ 760 at current prices by the end of 1966. The gross national product at constant 1958 prices amounted to 71,266 million drachmas in 1953 and increased to 159,369 million in 1966, an average annual increase rate of 6 per cent. This was, despite an element of recovery in it, one of the highest rates of increase during this period for any country, industrialised or developing. It was however accompanied to a certain extent by a rather skewed income distribution pattern both in terms of personal and of regional distribution.

We have mentioned that one of the most important features of the late fifties was the remarkable currency and price stability, particularly after the immediate post-devaluation price increases. In the 1954-56 period the average increase in the wholesale price index

was about 9.3 per cent, and in the cost of living index 8.2 per cent. In the three years that followed the wholesale price index actually declined by 0.1 per cent and the average rate of annual increase in the cost of living index was only 2 per cent, one of the lowest in the world. The drachma was becoming one of the most stable currencies in the world.(1) This notable stability continued with the

TABLE I

Annual Per Cent Changes in the Price Index

	1953	1954	1955	1956	1957	1958	1959
Wholesale Price Index	+15.3	+12.1	+7.3	+8.6	+0.6	-2.4	+1.6
Consumer Price Index	+9.0	+15.1	+5.8	+3.6	+2.3	+1.4	+2.3
	1960	1961	1962	1963	1964	1965	1966
Wholesale Price Index	+2.3	+1.6	-0.9	+5.1	+4.1	+4.3	+3.5
Consumer Price Index	+1.6	+1.8	-0.3	+3.0	+0.8	+3.0	+5.0

Note: Wholesale price and 1953-59 consumer price indices for the Greater Athens area only. 1960-66 consumer price index for all urban areas.

Source: Wholesale Index and 1953-59 Consumer Index: Bank of Greece, Economic Research Direction: The Greek Economy, Various Issues.
Consumer Index 1960-66: National Statistical Service of Greece: Statistical Yearbook of Greece, Athens, 1967, p. 351.

wholesale price index averaging an annual increase of less than 1.6 per cent in the period 1957-62, with a subsequent increase averaging just over 4 per cent annually in the 1963-66 period. The consumer price index fluctuated more, with a decrease of -0.3 per cent in 1962, and an increase of +5.0 per cent in 1966.(2) This last increase was mainly due to internal reasons, but an increase in the international prices of imported goods accounted for part of it.

The market structure in Greece affected the price effects of foreign capital inflow. The monopoly privilege extended by the government or by patent or trademark coverage to foreign investors sometimes permitted the maintenance or increase of the price of their products as a result of the quality of market differentiation.

(1) A.S. Gerakis and H.P. Wald: "Economic Stabilisation and Progress in Greece, 1953-1961", IMF Staff Papers, March 1964, p. 133 ff.
(2) W.O. Candilis: Op.cit., p. 92 ff.

An example of such distortion of the market structure is given by Howard S. Ellis.(1) The Dow Chemical Plant polystyrene investment of the early sixties priced clear polystyrene for plastics industry use at $ 600 per ton c.i.f., as compared with an international price of $ 370 per ton c.i.f. The Greek price covered bank charges and the 15.5 per cent import duty, raising the protection level effectively to 33 per cent. The type of remittance was also important in such cases, given that different forms of repayment for transferred

TABLE II

Gross Domestic Product Pattern by Industrial Origin at Factor Cost

	1953	1954	1955	1956	1957	1958	1959
Agriculture	31.9	30.1	30.1	29.2	30.7	27.7	27.8
Mining	0.9	0.9	1.0	1.0	1.0	1.1	1.0
Manufacturing	13.6	14.7	15.1	15.8	15.6	16.6	16.2
Constructions	4.3	4.2	4.6	5.0	4.8	5.5	6.1
Dwellings	10.7	10.8	10.5	10.3	10.0	10.1	10.1
Services	38.6	39.3	38.7	38.7	37.9	39.0	38.8
	1960	1961	1962	1963	1964	1965	1966
Agriculture	25.0	27.6	25.1	25.1	24.6	23.4	22.0
Mining	1.1	1.1	1.1	1.1	1.1	1.1	1.2
Manufacturing	17.3	16.7	17.3	17.8	18.0	18.2	19.0
Constructions	6.9	6.6	6.7	6.6	7.2	7.6	7.5
Dwellings	10.2	9.7	9.9	9.6	9.3	9.1	9.1
Services	39.5	38.3	39.9	39.8	39.8	40.6	41.2

Note: As per cent of total, at constant 1958 prices.
Sources: National Statistical Service: National Accounts of Greece, 1948-1970, X:2, No.21, Athens, May 1972.

capital resources or for licences may have different effects on pricing. Royalties for instance based on output are generally included as a fixed percentage of costs of all levels of output; those based on net sales are deducted from price at various levels with different effects on the marginal revenue and the cost structure of the foreign concerns, leading to price rises.

(1) Howard S. Ellis and Associates: Industrial Capital in Greek Development, Center of Economic Research, Athens, 1964, p. 293.

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Services	38.6	39.3	38.7	38.7	37.9	39.0	38.8
	1960	1961	1962	1963	1964	1965	1966
Agriculture	25.0	27.6	25.1	25.1	24.6	23.4	22.0
Mining	1.1	1.1	1.1	1.1	1.1	1.1	1.2
Manufacturing	17.3	16.7	17.3	17.8	18.0	18.2	19.0
Constructions	6.9	6.6	6.7	6.6	7.2	7.6	7.5
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The pattern of gross national product also changed during the period 1953-1966 (see Table II) and this is reflected in the increasing share of manufacturing industry at the expense of agriculture, despite the constant share of services. The extent and quality of this change is discussed in detail in later parts of this thesis.

CHAPTER THREE

Some Factors Directly Affecting the Performance of the Manufacturing Industry

A'. Capital Formation in Relation to Other Factors

Capital formation was one of several factors in the industrial development of Greece, but not necessarily the main causal one. Similarly the industrial revolution in England was not necessarily initiated exclusively by a considerable fast expansion in investment. Inventions and innovations, technical knowledge, and the presence of the other factors of production also helped the increase in productivity, and the increased rate of capital formation in turn reinforced the trend of economic development.(1)

The foundation of a working hypothesis on the role of capital formation in the development of the Greek manufacturing industry would involve a complex sociological tangle, and social sciences provide a large number of considerations showing that the advancement of industry also depended on factors other than capital formation and, in fact, was in itself far more than an economic problem.(2)

The relevance of non-economic factors, nevertheless, would undoubtedly lead to a wide-spread unsystematic speculation about social variability and human motivation. I shall therefore confine myself to the formation of a conceptual framework which will focus my research mainly on the direct implications of capital formation

(1) Moses Abramovitz: "The Economics of Growth", A Survey of Contemporary Economics, Vol. II, B.F. Haley, Homewood Illinois, 1952, pp. 161-2, 177.
(2) Ragnar Nurkse: Problems of Capital Formation in Underdeveloped Countries. Blackwell, Oxford, 1953, p. 157.

and of foreign capital invested in the Greek industry. I shall only briefly outline the horizons of human responses to stimuli to economic development other than capital formation, investment and effective use of foreign savings.

We note right away that the problem of resource shortages very seriously handicapped the exploitation of existing opportunities in the post-war Greece. Adam Smith first explained the role of limited market size in obstructing technological change and investment. His classic assessment that"...division of labour must always be limited ... by the extent of the market"(1) still applied to the relatively small and less developed Greek manufacturing industry. The individual Greek investor or producer could do very little to overcome this difficulty, because Say's law did not apply to the micro-level: supply did not create its own demand at the level of the individual producer.

Another factor limiting the formation of productive capital in Greece was the shortage of entrepreneurship, closely related with the problem of limited demand for capital. This is the function of perceiving and bringing about new combinations of factors of production in order to take advantage of existing or anticipated market situations.(2) With the help of technology and credit, entrepreneurs could have innovated and creatively applied unused or new ideas and techniques to the economic process of the country.(3)

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(1) Adam Smith: An Inquiry into the Nature and Causes of Wealth of Nations. 1776, Methuen, London, University Paperbacks Edition, 1961, Vol. I, Chapter III, p. 21 ff.
International Economic Association: The Economic Consequences of the Size of Nations. Proceedings of a Round Table held at Lisbon, August-September, 1957, London, 1960.

(2) Joseph Schumpeter: "Economic Theory and Entrepreneurial History", Change and the Entrepreneur, Cambridge, Mass., 1949, p.68 ff. Also see Weber and Tawney.

(3) Joseph Schumpeter: Business Cycles: A Theoretical and Statistical Analysis of the Capitalist Process. McGraw-Hill, New York, 1939, p. 102.

There exist in fact the two concepts of entrepreneurship: the entrepreneur in a Marshallian concept, i.e. the risk-bearing, courageous, imaginative individual who turns his vision of new potentialities and new combinations into reality, and secondly the entrepreneur-innovator, making use of new techniques, equipment, and specialists. Entrepreneurship helps introduce new concepts which revolutionise thinking and practice, and is the most crucial quasi-economic factor, other than capital formation itself, necessary for economic development.(1) It was lack of this function to a certain extent which retarded the potential demand for productive capital in Greece, where a good part of the available talent was apparently engaged in commercial and shipping operations abroad, with a resulting shortage in indigenous risktaking entrepreneurial ventures particularly in manufacturing industry.(2) The educational background of the available entrepreneurs also left much to be desired.(3) Some change nevertheless is reflected in the structure of entrepreneurship with the gradual spread of the corporate form, which in 1950 accounted for 463 companies ("societés anonymes" and limited companies). In 1958 the number had actually decreased to 391 (364 "anonymes" and 27 limited co.), less than five in a thousand of all concerns, the rest being privately owned. But already by 1962 they numbered 547 and in 1966 798 (604 "anonymes" and 194 limited co.), with a very considerably increased share

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(1) John M. Hunter: "Long-Term Foreign Investment and Underdeveloped Countries", Journal of Political Economy, Vol. LXI, February 1953, p. 17.
Frederic Harbison: "Entrepreneurial Organisation as a Factor in Economic Development", Quarterly Journal of Economics, August, 1958.

(2) George Coutsoumaris: The Morphology of Greek Industry, Center of Economic Research, Athens 1963, p. 25.
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(3) Ibid. p. 134-36.

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Howard Ellis and Associates: Op.cit., p. 133 ff.

(3) Ibid. p. 134-36.

of the market.(1)

Some authors have even suggested that there has been observed a process which brings a fairly quick change in the orientation of a society from initially adverse institutions and conditions to an intensification of the entrepreneurial function throughout the community. Weber presented the Reformation as a process which in relation with the Industrial Revolution provided the stimulus for the activation of resources and investment opportunities.(2) Much has been written about the "protestant spirit" of anglo-saxon societies which has affected the will to economise, the attitude to work, and the economic institutions of the countries where this spirit prevails. Others present phenomena like the Meiji Restoration against the Togugawa shogunate in 19th century Japan as exercising a motivating influence behind the subsequent economic development and intensification of the entrepreneurial function.(3) This motivating influence is expressed in the risk-bearing willingness of the enterprising society which assumes long-term risks (long-term capital budgeting) in long-run productive investments.(4) Other authors,

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(1) Federation of Greek Industries: The State of Greek Industry in 1954 and 1955, Athens 1956, p. 55; Ibid, in 1959, Athens 1960, p. 41; Ibid in 1964, Athens 1965, p. 137; Ibid in 1968, Athens 1969, p. 72. (All in Greek).

(2) Kenneth Boulding: "Religious Foundations of Economic Progress", Harvard Business Review, May, 1952, p. 36.
Yule Brozen: "Determinants of Entrepreneurial Ability", Social Research, Autumn 1954, p. 345 ff.
P.T. Bauer and B.S. Yamey: The Economics of Underdeveloped Countries, Cambridge University Press, Cambridge, 1957, pp. 103-105.
Celso Furtado: "Capital Formation and Economic Development", The Economics of Underdevelopment, A.N. Agarwala and S.P. Singh, Editors, Oxford University Press, Galaxy, New York, 1963, p. 326.

(3) Marion J. Levy: "Contrasting Factors in the Modernization of China and Japan", Economic Development and Cultural Change, October 1953, p. 190 ff.
W.A. Lewis: The Theory of Economic Growth, Allen and Unwin Ltd., London, 1963, p. 87 ff.
G.C. Allen: A Short Economic History of Modern Japan, Allen and Unwin, London, 1946.

(4) Raymond Mikesell: Promoting U.S. Private Investment Abroad, National Planning Association, Washington, D.C., 1957, p. 8 ff.

finally, have considered the phenomenon of capital formation and the entrepreneurial function in theory in terms of groups which are not integrated into a local society, such as the Jews, Mormons, Parsee Tats in India, Armenian and Lebanese immigrants in the Near East, and Chinese Tans in S.E. Asia. Greek communities in the Middle East, Africa and America have produced in this respect thriving business enterprises, and we observe that a large number of private foreign investments in Greece were made by such immigrant entrepreneurs, who channelled some of their capital and experience back to the fatherland.

It is one of the purposes of this thesis to establish whether the spirit of structural change, so necessary for a re-orientation of the society in this manner, has actually been promoted in Greece in the period up to 1966, particularly with respect to the creation of a new outlook in the manufacturing industry.

B'. The Structure of Investments

Modern theories of economic development present several factors to account for economic progress: industrial expansion, changes in agriculture, basic social services, physical social overhead capital (infrastructure). All those factors require capital formation and involve restrictions in immediate consumption. The stagnant Greek economy of the pre-war period was characterised by low rates of investment which could not secure a "take-off into sustained growth", i.e. enough dynamism for the process of high rates of investment to become self-sustained.(1) With a deficient rate of investment foreign capital can be used to help what Harrod described as "assisted take-off". And if, as Rostow indicates, several countries managed to attain self-sustained growth without use of foreign capital, for Greece in the prewar period and in the fifties, as for many other developing economies as well, this external supplement to domestic savings was a crucial factor whose absence hindered the process of growth.(2)

Several strategies of capital accumulation and several investment priorities have generally been advocated which set out to establish the preconditions of a transformation in a series of periods. On one hand there exist several versions of balanced growth theories. Some assume a certain critical minimum of investible resources and overhead capital for a simultaneous rise in demand for goods and expansion in consumer goods industries : a group of industries developed simultaneously in a planned process will have a higher "social marginal product", than if they develop

(1) W.W. Rostow: The Stages of Economic Growth, Cambridge University Press, London, 1961, p. 37.
(2) W.W. Rostow: "The Take-off into Self-Sustained Growth", The Economic Journal, 66, March 1956, pp. 25-48.

separately.(1) Others stress the necessity to invest in social overhead capital (economic infrastructure) at the same time, in as large a number of complementary industries as possible,(2) mainly in consumer goods industries and agriculture, with a parallel effort to increase export trade and import substitution. Models exist of "uniform growth" of fixed capital coefficients and changes in the production processes of a constant rate.(3) Some advocate "balanced growth" because of a resulting balanced constancy of the relative price structures;(4) or because of the uniform changes in the income elasticities of demand necessary to avoid bottle-necks in the expansion of the economy,(5) so that the composition of the changing production be balanced with respect to demand; or for the sake of pecuniary external economies resulting from the interdependence of the expanding sectors.(6) One perhaps could go back to the four-year development plan presented by the Greek government to the European Economic Cooperation Organisation, following the agreement for Intra-European Payments and Compensations of October 1948 between the Marshall Plan countries, but never put into effect, for a first effort of such planning requiring deep structural changes of the economy.

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(1) Paul N. Rosenstein-Rodan: "Notes on the Theory of the 'Big Push'", Economic Development for Latin America: Proceedings of a Conference, H.S. Ellis and M.W. Wallish, Eds., MacMillan, London, 1961, Ch. III.
Paul N. Rosenstein-Rodan: "Problems of Industrialisation of Eastern and South-Eastern Europe", Economic Journal, June, 1943.

(2) Ragnar Nurkse: Problems of Capital Formation in Underdeveloped Countries, Oxford University Press, 1953, p. 11.

(3) Gustav Cassel: Theoretische Sozialökonomie, Vierte Auflage, Leipzig, 1927, pp. 27-34.
Robert Solow and Paul Samuelson: "Balanced Growth under Constant Returns to Scale", Econometrica, 1953.

(4) W.A. Lewis: The Theory of Economic Growth, Allen and Unwin, London, 1963, pp. 276 ff., 383 ff.

(5) Skiv Kumar Nath: "The Theory of Balanced Growth", Oxford Economic Papers, New Series, Vol. 14, 1962, p. 142.

(6) Tibor Scitovsky: "Growth: Balanced or Unbalanced", The Allocation of Economic Resources, Abramovitz, Ed., Stanford, 1959.

And on the other hand, inbalance should for others be the end result of a planning process.(1) We could consider this approach as an elaboration of Rostow's take-off theory. It requires a "critical minimum effort" to raise income above the "low-level equilibrium trap", and foreign capital is one of the means of breaking this impasse.(2) The best type of investments for the development of a backward country are not always those which restore "balance" within the economy. Hirschman for instance argues the balanced growth may exceed the capabilities of the country where a simultaneous multiple development is hindered by a shortage of entrepreneurial talent in several sectors at the same time. For the economy to move ahead, the development policy should "maintain tensions, disproportions, and disequilibria": a chain of unbalanced growth sequences in sectors of interrelated input requirements and output demand would result in a disequilibrium development move.(3) If more and more capital is channeled in such investment projects, then this would lead the economy away from balanced equilibrium, and would nevertheless create a favourable economic environment which would provide stimulus to further investment. Indivisibilities and dynamic complementarities in an investment process would also favour an unbalanced pattern of growth.(4) But one of course should in the first place be able to distinguish between harmful substitut-

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(1) Harvey Leibenstein: A Theory of Economic-Demographic Development. Princeton University Press, 1954, Ch. IV-V.
Walter Galeson and Harvey Leibenstein: "Investment Criteria, Productivity, and Economic Development", Quarterly Journal of Economics. Vol. LXIX, Aug. 1955, p. 143 ff.
Hla Myint: "Big Push and Balanced Growth", The Economics of the Developing Countries, Fr. Praeger, New York, p. 117 ff.

(2) Richard R. Nelson: "A Theory of the Low-Level Equilibrium Trap in Underdeveloped Countries", American Economic Review, 46, Dec. 1956, pp. 903-4.

(3) A.O. Hirschman: The Strategy of Economic Development, Yale Univ. Press, New Haven, Conn., 1958, Ch. 3-5, p. 66 ff.

(4) P. Streeten: "Unbalanced Growth", Oxford Economic Papers, June 1959.
P. Streeten: "Unbalanced Growth: A Reply", Ibid, March, 1963.

abilities and beneficial complementarities, given that often ambitious development projects fail or work under capacity (therefore uneconomically) because the general level of development in the country is handicapping their performance. Unbalanced growth sequences have actually been observed in a number of developing countries under all kinds of political systems,(1) including Greece.

The overall ratio of gross fixed investment/gross national product at market prices rose considerably during this period in Greece particularly after 1958, when it amounted to 19.1 per cent. It rose to 24.7 per cent at constant prices by 1966. These ratios were certainly higher than the ratios observed in the Greek economy before the second world war, but were still lower than those in other advanced European countries. The considerably increased amounts of fixed capital investments were channeled in Greece to a number of activities (see Table III) and there was a relative inflexibility in the pattern of distribution of the available funds, with two leading sectors: dwelling construction and transport-communications. Manufacturing industry only took third place. There was a notable increase in the share of transport, in particular in the late fifties and early sixties, with a parallel decline in housing. Investment in ships accounted for much of this investment, but its allocative efficiency remains uncertain, given that on one hand it attracted a high rate of foreign finance, but on the other hand it was subject to unpredictable and irregular fluctuations depending on factors determined exogenously in the world markets.

Construction in general and housing in particular were the outstanding issues in the pattern of reproducible capital assets of the Greek economy and provided perforce a leading sector which

(1) John M. Montias: "Unbalanced Growth in Rumania", American Economic Review, Vol. LIII, Number 2, May 1963, p. 562 ff.

accounted for much of the growth rate of the economy. Investment in housing was high not only to make good for war damage and to accommodate population shifting from the country-side to the big cities, but also in response to speculation in real estate investments in the absence of capital gains taxes, to the secure inflation-proof character of investment in buildings (particularly in the beginning of the period), and to socially-motivated considerations such as the dowry system and prestige housing accommodation. And yet a reallocation of resources in the fifties resulting in a restriction of relatively luxurious dwellings (about one-third of the

TABLE III

Fixed Capital Investments by Sector As Proportion of Total Investment

	1953	1954	1955	1956	1957	1958	1959
Agriculture	0.0784	0.0825	0.0785	0.0872	0.1295	0.1299	0.1276
Mining	0.0141	0.0103	0.0075	0.0123	0.0162	0.0138	0.0048
Manufacturing	0.1232	0.0988	0.1015	0.1027	0.1240	0.1122	0.0879
Electricity-Gas	0.1095	0.1030	0.0978	0.1121	0.0626	0.0642	0.0760
Transport-Communications (including Ships)	0.0819	0.1596	0.1337	0.1523	0.1968	0.2586	0.3154
Dwellings	0.4317	0.3958	0.4308	0.3950	0.3481	0.3161	0.2569
Public Administration	0.0463	0.0250	0.0221	0.0179	0.0183	0.0054	0.0098
Other Services	0.1145	0.1246	0.1276	0.1200	0.1041	0.0993	0.1211

	1960	1961	1962	1963	1964	1965	1966
Agriculture	0.1287	0.1384	0.1274	0.1469	0.1298	0.1266	0.1067
Mining	0.0038	0.0051	0.0065	0.0107	0.0092	0.0103	0.0102
Manufacturing	0.0663	0.0835	0.1014	0.1087	0.1122	0.1226	0.1040
Electricity-Gas	0.0522	0.0516	0.0720	0.0685	0.0770	0.0855	0.0694
Transport-Communications (including Ships)	0.4171	0.3667	0.2780	0.1904	0.2336	0.2185	0.2803
Dwellings	0.2128	0.2330	0.2713	0.3053	0.3001	0.3008	0.2874
Public Administration	0.0103	0.0086	0.0084	0.0099	0.0070	0.0038	0.0084
Other Services	0.1086	0.1127	0.1346	0.1592	0.1306	0.1316	0.1331

Note: At constant 1958 prices.
Source: Computed from data in Sources, Table II, p. 23 above.

total) would have allowed a doubling of directly productive investment and given that the import content of such luxury housing

accounted for much of the growth rate of the economy. Investment in housing was high not only to make good for war damage and to accommodate population shifting from the country-side to the big cities, but also in response to speculation in real estate investments in the absence of capital gains taxes, to the secure inflation-proof character of investment in buildings (particularly in the beginning of the period), and to socially-motivated considerations such as the dowry system and prestige housing accommodation. And yet a reallocation of resources in the fifties resulting in a restriction of relatively luxurious dwellings (about one-third of the

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Source: Computed from data in Sources, Table II, p. 23 above.

total) would have allowed a doubling of directly productive investment and given that the import content of such luxury housing

was about 30 per cent, such a reallocation might have provided a balance of payments benefit in a more balanced-growth context.

The fundamental imbalance in the structure of distribution of investments is reflected not so much in the above average share of housing (probably the highest in Europe) but in the sluggish development of investment in manufacturing (for most of the time the lowest in Europe). This actually declined in the early sixties to an alarming degree, with a slow increasing rate observed consistently during the remaining of the period.(1) Manufacturing industry was never a spearhead of development. We note the encouraging fact that the largest increase was in the capital goods industries, averaging an annual rate of increase of 7.8 per cent in the decade 1953-63, increasing to 17.4 per cent in the period 1963-66. Despite this increase, the average 10.7 per cent of total fixed capital investments channeled to manufacturing in the period 1960-66, was disappointing in absolute terms when compared with Western European rates which average 31.4 in Portugal, 30.4 in Belgium, 29.5 in W. Germany, 25.9 in the U.K., 23.0 in Sweden, 21.9 in Ireland, 18.9 in Norway, and 16.8 in Denmark over the period 1960-64. Notwithstanding the much higher per cent rate of growth of investments in manufacturing in Greece it should take a considerable period of time before the amount invested in manufacturing as per cent of total investments approaches the western European average. The heavy emphasis on consumer goods industries which was apparent for most of the period was not so pronounced in more recent years, and amounted to only 42.9 per cent of the total number of industrial establishments in 1966 as compared with 73.7 per cent in 1958. A parallel increase in the share of capital goods industries from

(1) Royal Hellenic Research Foundation: Long-Term Prospects for the Greek Economy, (In Greek), Athens, 1967, p. 69 ff., p. 183 ff.

21.8 to 28.4 per cent was observed. The increasing share of capital intensive industries in the total of gross fixed capital stock in manufacturing could indicate a qualitative improvement within the structure of industry, and by the year 1966 just over half of the gross fixed capital stock was in the chemical, non-metalic minerals, basic metals and metal products branches. The basic metal (ISIC branch 34) and chemicals-petroleum (ISIC branches 29-32) industries showed the greatest increase in capital stock in the sixties.(1) The relative number of small productive units recessed as the share of "major" manufacturing industries employing at least 10 persons rose from 62 per cent of total value added to about 75 per cent in 1966, with a parallel decrease in the importance of handicraft industries. By 1966 Greek industry (including manufacturing, mining, power, and construction) accounted for 30 per cent of the gross domestic product as compared with 20 per cent in 1953. Manufacturing alone accounted for about 19 per cent of GDP in 1966 as compared with 13.5 per cent in 1953. In the next part of this chapter we shall examine to what extent this change in the structure of capital formation was self-financed and to what extent it contributed to self-sustained growth.

(1) See Table LVII below.

C'. The Importance of Savings in Financing Fixed Capital Formation

Whatever the role of entrepreneurship in the advancement of economic activity in the manufacturing sector, other factors too have contributed to or sometimes inhibited this advancement. The behaviour of savings was particularly interesting in this respect. Savings in Greece were low for most of the period, only a small part of all means available for financing the gross expenditure of the economy, particularly before the year 1960, and the formation of net productive capital was restricted, more especially in the manufacturing industry.(1) The rise of private savings was generally correlated with the rising level of per capita disposable income, although the income distribution, rigid consumption habits, institutional organisation and socio-political elements were also important.(2) A considerable re-channeling of private savings by a very extensive use of monetary policy was evident in more recent years, the narrow savings margins becoming more comfortable after the year 1963. Compared with similar figures from western European economies nevertheless the level of gross fixed capital formation per capita still remained low and the structure and allocation of investment priorities less than optimal, resulting in inadequate contributions of such narrow savings to a satisfactory level of direct investment financing, particularly in the manufacturing industry. This was obvious in view of the fact that gross savings including both the private and public sectors still formed only a small percentage of the Gross Domestic Product, and were well below the level of fixed asset formation. Gross savings in fact fi-

(1) Richard M. Westebbe: Savings and Investment in Greece. Center of Economic Research, Athens, 1964, p. 21 ff.
(2) Howard S. Ellis and Associates: Op.cit., p. 30.

vanced investments at a declining rate until the early sixties (see Table IV) when their share increased again relieving the acute problem of capital accumulation in the aggregate sense to a certain degree. Excluding investment in ships, largely financed by borrowing and transfers from abroad the same trend is observed.

TABLE IV

Per Cent Share of Savings in Financing the Gross Domestic Asset Formation

	1953	1954	1955	1956	1957	1958	1959
Private Savings/ Private Investm.	94.8	23.3	64.4	73.8	75.3	47.3	54.6
Governm. Savings/ Governm. Investm.	20.4	16.1	52.3	26.8	63.6	57.1	33.7
	1960	1961	1962	1963	1964	1965	1966
Private Savings/ Private Investm.	40.2	65.1	59.1	78.4	74.6	71.6	63.9
Governm. Savings/ Governm. Investm.	39.6	51.9	57.8	57.5	47.7	33.7	48.9

Note: Investments indicate gross capital formation excluding changes in stocks. "Private savings" includes savings of corporations etc. "Government savings" include the surplus on current account of the central government, the local authorities and the social security funds. Investment includes investment in ships.

Source: Computed at current prices from data in Sources, Table II, p. 23 above.

There was a marked increase in the propensity to save in the period 1963-66 as compared with the period 1958-62, and a much increased share of such savings in financing investments. The pattern of gross capital savings in fact affected the level considerably, particularly in the public sector: where in 1948-52 we had negative public investment (a deficit on current account of the central government, local authorities and social security funds), in the subsequent period it alone accounted for well over 15 per cent of total investment. In 1957 the government current account showed a surplus and by the end of the decade public loans were raised. Many more major issues were floated in the sixties, and the overall level of investments was influenced by that of public investments increasing faster than the private ones to finance

important infrastructure works. Despite this improvement the rate of public investment was much lower than in many western European countries where it covered sometimes up to 40 per cent of all investment

The rate of interest on deposits was increased after the reorganisation of credit in 1956, to attract funds from the free market, and occasionally valorisation clauses and tax exemptions were introduced for special issues deemed of public interest. The peasant economy of the countryside had a further incentive for market orientation as savings deposits were introduced there. The increased savings in the ensuing period of monetary and fiscal stability resulted in an increase in private deposits in commercial banks and other financial institutions, as bank deposits became preferable to gold hoarding, with a resulting eventual reduction in the initially high interest rates. Bank credit increasingly financed not only exporting industries but most types of fixed capital investment, under simplified and liberalised credit rules.(1)

By the end of the period OECD estimated that over two-thirds of the total private industrial assets had been financed by commercial bank loans, as productive investments rather than speculative activies attracted the initiative of private entrepreneurs. We note, nevertheless, that credits to the manufacturing industry increased less than credits to public utility companies, to the private housing sector, or the trade: not surprisingly perhaps, given the consistently higher rates on loans to industry. One should not overlook the beneficial role of specialised agencies of long-term financing, providing favourable terms and many other

(1) Demetrios N. Galanis: Sources and Methods of Financing Investment in Greek Industry. Bank of Greece, Papers and Lectures No. 15, (in Greek), Athens, 1963.

"subsidised credit" facilities. Long-term loans to industry[1] increased significantly if inconsistently, and more investment banks were established, sometimes with the participation of foreign banks or capital, in the effort to lower production costs to acceptable levels. Some firms, nevertheless, mainly because of organisational deficiencies connected with the family management of industry, having secured their fixed capital, tended to ignore their working capital requirements, with a resulting under utilisation of capacity. Throughout the period official credit control has discriminated consistently (if not always effectively) against imports, but firms could always finance a substantial share of their imports by non-official credit in the free market.

TABLE V

Financing the Economy: 1953-66

	Private Deposits	Total Bank Credit	Credit to Manufacturing	Long-term Credit to Manufacturing
1953	1,579	8,215	3,262	N.A.
1954	2,250	10,511	4,036	1,667
1955	3,102	11,576	4,258	1,742
1956	4,319	14,688	5,326	1,785
1957	7,611	18,916	7,128	1,824
1958	10,032	22,315	8,614	1,992
1959	13,627	24,963	9,209	2,204
1960	16,365	29,234	10,911	2,497
1961	19,312	32,635	12,146	2,761
1962	24,164	37,947	14,151	3,397
1963	29,917	45,400	16,705	4,068
1964	34,042	52,635	19,132	4,931
1965	38,026	59,264	20,765	5,297
1966	46,225	68,813	24,220	5,832

Note: All entries in million drachmas at current prices, denote outstanding totals at the end of period. Manufacturing entries include credits to handicraft. Also see Table VI.

Source: National Statistical Service of Greece: Statistical Yearbook of Greece, various issues, "Money and Banking" tables.

(1) See Tables V and VI.

TABLE VI

Long-Term Bank Loans by Branch of the Manufacturing Industry :

Amounts Outstanding at the End of Each Period

(In million drachmas, at current prices .
Constant 1958 prices in parenthesis)

	20-22 Food-Drink-Tobacco	23 Textiles	24 Clothing-Footwear	25-26 Wood-Cork-Furniture	27-28 Paper-Printing	29-32 Leather-Rubber-Plastics-Chemicals-Petrol
1956	412.8 (407.1)	235.8 (232.6)	3.9 (3.8)	19.9 (19.6)	32.1 (31.7)	355.1 (350.2)
1957	473.8 (463.1)	279.0 (272.7)	4.1 (4.0)	19.8 (19.4)	29.8 (29.1)	341.4 (333.7)
1958	550.1 (550.1)	350.5 (350.5)	4.5 (4.5)	25.2 (25.2)	31.6 (31.6)	342.2 (342.2)
1959	705.1 (629.9)	445.7 (398.1)	10.7 (9.6)	24.6 (22.0)	35.9 (32.1)	355.8 (317.8)
1960	801.7 (691.6)	395.7 (341.4)	16.4 (14.1)	21.5 (18.5)	58.8 (50.7)	367.6 (317.1)
1961	888.0 (745.9)	469.0 (394.0)	13.6 (11.4)	24.6 (20.7)	65.5 (55.0)	391.0 (329.5)
1962	921.7 (689.1)	443.7 (331.7)	14.1 (10.5)	25.0 (18.7)	155.4 (116.2)	393.8 (294.4)
1963	1 029.8 (768.9)	586.0 (437.5)	14.5 (10.8)	36.4 (27.2)	203.6 (152.0)	452.9 (338.2)
1964	1 111.7 (804.0)	818.7 (592.1)	15.2 (11.0)	57.4 (41.5)	367.0 (265.4)	646.8 (467.8)
1965	1 123.9 (824.9)	815.7 (598.7)	17.3 (12.7)	65.1 (47.8)	398.6 (292.6)	637.5 (467.9)
1966	1 249.2 (891.8)	941.4 (672.1)	18.2 (13.0)	81.2 (58.0)	417.6 (298.1)	674.0 (481.5)

	33 Non-metallic Minerals	34 Basic Metal Industries	35-37 Metal Prod.-Machines-Electr.Equipm.	38 Transport Equipment	39 Miscellaneous Industries
1956	181.0 (178.5)	83.5 (82.4)	345.3 (340.6)		123.0 (121.3)
1957	176.3 (172.3)	69.3 (67.7)	343.7 (336.0)		129.8 (126.9)
1958	178.2 (178.2)	72.5 (72.5)	373.8 (373.8)		135.1 (135.1)
1959	164.4 (146.9)	63.3 (56.5)	445.1 (397.6)		154.9 (138.4)
1960	180.8 (156.0)	66.1 (57.0)	362.8 (313.0)	109.2 (94.2)	73.7 (63.6)
1961	165.3 (138.9)	135.9 (114.2)	350.2 (294.2)	118.2 (99.3)	88.8 (74.6)
1962	205.7 (153.8)	309.8 (231.6)	471.4 (352.4)	185.7 (138.8)	165.0 (123.4)
1963	290.0 (216.5)	363.2 (271.2)	684.5 (511.1)	187.9 (140.3)	219.0 (163.5)
1964	385.1 (278.5)	422.0 (305.2)	599.7 (433.7)	280.5 (202.9)	226.9 (164.1)
1965	347.6 (255.1)	658.4 (483.3)	627.5 (460.6)	277.9 (204.0)	327.0 (240.0)
1966	392.8 (230.4)	698.2 (498.5)	818.1 (584.1)	255.0 (182.0)	289.0 (205.3)

Note : Also see the previous Table V.
The above classification follows that of the NSSG and corresponds to the Index of Industrial Production. All entries grouped accordingly.
Branch 34 prior to 1960 includes financing for Larymna works.
Branch 35-37 prior to 1960 includes steel working industries, subsequently classified under branch 34. Same branch 35-37 prior to 1960 also includes transport equipment components, subsequently classified under branch 38.
Statistical information for the years before 1956 not available.

Source : National Statistical Service : Monthly Statistical Bulletin, Issue of April 1960, Table 23, p. 29 for the years 1956 to 1959; Issue of December 1963, Table 25, pp. 40-41 for the years 1960 to 1962; Issue of December 1968, Table 25, pp. 40-41 for the years 1963 to 1966.
End of December entries only are presented for all years.

Forced saving following a long-term inflationary policy has never been seriously entertained in Greece as a possible source of finance for a sustained high rate of development, except in certain quarters near the end of the period in question. Of course a solution of "controlled inflation" does not take into account the fact that unlike mature capitalist economies where there may be danger of stagnation due to oversaving, the Greek economy was for most of the time threatened with inflation for want of saving. An advanced economy, as experience has shown, may under certain circumstances profit from an inflationary policy followed by a rise in prices and a consequent income redistribution in favour of capital accumulation. Experience with inflation nevertheless, is not successfully applicable to the Greek economy, for the reason that in an economy where capital is scarce and the standard of living rather low, inflationary measures hardly bring about any "forced saving" at all. In other words the relatively inflexible structure of the Greek economy would not react to the additional purchasing power that deficit financing implies. Uncontrolled monetary expansion always resulted in an increased demand and disproportionate rises in the import bill (given the existing import elasticity of just under 2.0), since little of the newly created money could be channeled into productive investment. And this despite the introduction of liberal long-term credit facilities, to the extent of channeling by law at least 15 per cent of commercial bank loans to medium or long-term loans, at rates sometimes even lower than those on short-term credit. The perverse effects of "psychological inflation" so very common in the Greek experience and sometimes defying in its intensity even the economic trends of the moment aggravated the situation whenever any economic upheaval or adjustment was rumoured or felt.

We noted that the inflexible structure of the Greek economy

would not react to the additional purchasing power of inflationary financing by an increase in investments. Other reasons have also contributed to this effect in the past: an inadequate public administration and an archaic technical education would handicap even a sound political programme of development based on the narrow limits that the high defence expenditures and the agricultural subsidies allowed. As a result public investment expenditure was scaled down when progressively in the mid-fifties the reduced U.S. aid ceased covering the budget deficits. Quite predictably deficit financing in the 1964-5 period, not for investments but for public expenditure to meet wage demands and subsidy claims resulted in practically no "forced saving" at all, but simply in inflationary price increases which eroded some of the advantages of the recipients, leaving the non-beneficiaries, if anything, worse off, and brought about a parallel marked deterioration in the balance of payments position with a widening current account deficit.

The non-availability of domestic savings as a limiting factor became obvious in the operation of the usual multiplier-accelerator process in the context of the non-diversified Greek manufacturing industry operating substantially below capacity-production. Foreign investments created income in a given sector of the industry where the investment took place in the first instance. The input requirements of this sector were not always properly catered for by other secondary industries, because such did not always exist. Until those were developed the multiplier-accelerator process became only partly activised and did not generate a particularly high demand in the absence of pre-existing high productive capacity either in the consumption or investment goods industries.

The task of the monetary-fiscal authorities during this period clearly had to be to avoid spending any such increase in income

generated in the foreign-financed sector of the economy, but mobilise it instead into savings and divert it to capital formation, which would not press upon the existing low standard of living, and would prevent a rise in consumption to the full extent of the rise in income. To this effect policies in Greece were only partly successful. A moderate increase in consumption was unavoidable (if not considered necessary in certain quarters to maintain the incentive to increased production and efficiency). Only at the end of the period a marginal rate of savings consistently higher than the average rate was achieved, and pulled the average rate higher towards a process of development which could become self-generating.(1)

Experience with inflation and capital inflows in Greece has shown that in the first instance a large increase in the inflow of foreign capital often resulted in an increase in inflationary pressures, whatever the balance of payments improvement in the short-run might be. It is obvious that unless supplementary domestic savings (non-inflationary) were available to finance the domestic component of an expanded investment programme, leaving the foreign exchange proceeds intact to finance the import content of investments, part of the foreign exchange had to be used to finance increased imports of consumption goods.(2) This addition to imported consumables was sometimes in excess of the net addition to reserves, to meet a demand of the recipients of money incomes generated from the inflow of capital, inflated through the multiplier and fostered

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(1) See Table IV, p. 38.

(2) See Table X. For background reading in this topic see G. Haberler: Prosperity and Depression, Harvard University Press, Cambridge, Mass., 1958, p. 446 ff.
Antonin Basch: Financing Economic Development, The Macmillan Co., New York, 1964.

by the potential price effects.(1)

In fact the rise in the level of aggregate expenditure in Greece during such periods of inflationary pressures, as far as inflow of foreign capital is concerned, did not come from income of labour or suppliers in industries complementary to the foreign-financed concern alone. Some of the foreign investors had sought to finance part of their programme by raising additional capital in Greece, and there is evidence that given the extraordinary low-cost credit granted by Greek investment banks, foreign investors relied increasingly on domestic capital, with a resulting increase in the pressures on the existing fiscal and monetary controls of inflation. Additionally, any increase in the foreign exchange reserves of the banking system in general, following an increase in the inflow of capital, and implicitly any increase in the cash reserves of the commercial banks, required a strong intervention from the part of the Bank of Greece to avert further inflationary expansion of commercial bank loans in the short run and an aggravation of the monetary and exchange problems.(2)

In the short periods when inflationary pressures receded, by contrast, it is likely that a larger part of the incomes generated by any such sudden increase in the inflow of foreign capital were saved and did not reach the market with the same speed as in a period of inflation. This undoubtedly resulted in a relatively smaller

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(1) J.J. Polak: "Balance of Payments of Countries Reconstructing the Help of Foreign Loans", The Quarterly Journal of Economics, February, 1943, pp. 208-240.
Princeton University: "Conceptual Problems Involved in Projections of International Sector of Gross National Product", Long Range Economic Projection, Studies in Income and Wealth, Vol. 16, Princeton, 1954, pp. 418-19.
Donald Bailey Marsh: World Trade and Investment. The Economics of Interdependence, Harcourt, Brace and Co., New York, 1951, p. 69 ff.

(2) Nurul Islam: Foreign Capital and Economic Development: Japan, India, and Canada, Ch.E.Tuttle, Rutland, Vt., Tokyo, Japan, 1960, p. 20 ff.
Carl Iversen: Aspects of the Theory of International Capital Movements, Oxford University Press, London, 1936, p. 197 ff.

immediate increase in aggregate demand. With no other obvious increase in expenditure, the output of newly produced goods through the operation of the new foreign-financed industries entered the Greek market after a gestation period, and in addition to the established capacity. Monetary and fiscal policy could then allow an increase in money velocity in proportion to the increase in real output, leaving the price level unchanged: the increase in incomes was matched more evenly by an increase in supply.(1)

Much of course depended at any time on the relative structure of output. If the new foreign-financed industries produced for the export market (or provided substitutes for imports) then the trade balance obviously improved, but to the extent that this improvement were not matched by a rise in savings, the multiplier effect led to induced rise in imports and a simultaneous increase in domestic inflationary pressures. The key factor therefore in what concerned inflation control seems to have been whether the new income generated by an increased inflow of foreign capital was channeled to consumption before the product of the investment entered the market, and whether it was likely to be exported (or attract buyers away from imports) for a simultaneous balance of payments benefit. This improvement had to be matched by a rise in savings to avert increased imports, for a lasting effect.

We should mention in conclusion, nevertheless, that it was not always the shortage of total resources in the Greek manufacturing industry that restricted productive capital formation. At times it looked as if the supply of savings, limited as it was, formed

(1)For the theorectical background to the argument see: A.E. Kahn: "Investment Criteria in Development Programme", The Quarterly Journal of Economics. February 1951,pp. 38-61.
H.B. Chenery: "The Application of Investment Criteria", The Quarterly Journal of Economics. February 1953, pp. 76-96.
James C. Ingram: "Capital Imports and the Balance of Payments", The Southern Economic Journal. Vol. XXII, No. 4, April 1956, p. 415 ff.

a less significant limitation on the rate of productive capital formation, and was a less important growth-inhibiting factor. This happened in the case of the so-called "passive" forms of capital,[1] including not only accumulation and hoarding of gold or foreign exchange, but also high rates of misallocated investments, or flight of capital. The volume of capital formation could only be increased by altering the investment pattern in the country.[2] Disinvestment of accumulated passive capital might have provided resources through the limitation or sale of the economy's unproductive assets if the demand for new productive investment were sufficiently strong. This of course would have also involved cultural, social, religious, economic, and political motivations and values to overcome social inertia. It was a striking failure of the Greek economy for most of the period, that it never really took up the challenge, and came short of producing those motivations to any significant degree.

(1) Wilfred Malenbaum: "The Government in Economic Development in India", Center for International Studies Paper, M.I.T., Cambridge, Mass., October 1953.
(2) C. Wolf and S. Sufrin: Capital Formation and Foreign Investment in Underdeveloped Areas, Syracuse, University Press, Syracuse, N.Y., 1955, p. 13 ff.

CHAPTER FOUR

The Balance of Capital Movements : their Adjustment Process in Theory their Structural Form in Policy and their Effective Measurement in Practice

A. The "Pure" Theory of International Capital Movements

I. From the time of Ricardo there has been a "pure" theory of international trade, but there was no pure theory of international capital movements. The controversy on the theoretical and practical implications of international capital movements was examined after the first world war in conjunction with the problem of the capacity of the German economy to transfer reparations imposed by the treaty of Versailles. This generated the famous Keynes-Ohlin debate where Ohlin, using mostly a "Keynesian" approach, laid the foundations of the modern theoretical analysis to account for the adjustment mechanism in the balance of payments.(1) Further developments in modern theory, in the form of systematic analysis of the international capital movements following the Austrian capital theory were introduced by R. Nurkse.(2)

Recent years have brought about an incease in the rate of growth of international private and public capital flows to such an extent, that by the early sixties those flows had if not surpassed, regained the dollar value achieved in the twenties (1924-1929), the "golden age" of international investment.(3) Experience has shown that there is no guarantee that the flow of foreign investment moves from the most to the least industrialised coun-

(1) Harry Johnson : International Trade and Economic Growth, Unwin, London, 1965, Chapter VIII, p. 169 ff.
(2) Ragnar Nurkse : "Causes and Effects of Capital Movements", Reprinted in Equilibrium and Growth in the World Economy, Cambridge Univ. Press, 1961.
(3) Paul Meek : "The Revival of International Capital Markets", A.E.R., Vol. L (Supplement), May 1960, p. 282.

tries. On the contrary capital movements may take place almost entirely among the "high-income" regions. The investing companies seek to improve their "share of the market" in global terms[1] but no optimising investment pattern rationally indicates to investors with any degree of certainty locations of optimum investment opportunities solely on the basis of the level of development of the capital-receiving economy. In fact more recent statistics show that the pattern of growth of international direct investment has suffered a decrease as far as the developing economies are concerned, with most of the decline attributed to the receipts of certain South American countries.[2] A parallel increase in the receipts of industrialised countries and in particular of the E.E.C. countries is observed.[3] Of the non-industrialised countries Greece showed a considerable increase in receipts.

It is nevertheless generally accepted that those capital movements can only take place if there is a corresponding flow of goods and services to equilibrate the money flow. This equilibrium in an open economy is expected to be achieved between the borrowing country and the rest of the world over a certain period of time (for example several years), given no net change in foreign reserves, a stable exhange rate, no expansions or restrictions of domestic economic activity or of foreign trade, and no excessive deflation or inflation over this period.[4]

In what concerns the methods of adjustment of an accomodating deficit on current account the classical price-elasticity-flow

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(1) Raymond Vernon : "International Investment and International Trade in the Product Cycle", Quarterly Journal of Economics, Vol.LXXX, May 1966, No.2, p. 200.

(2) Marcus Diamond : "Trends in the Flow of International Private Capital : 1957-1965", I.M.F. Staff Papers, Vol.XIV,No.1,March 1967, p. 7.

(3) Jean-Claude Dischamps : "L'Integration Communautaire et l'Evolution des Investissements dans la C.E.E.", Revue Economique, Vol.XVIII,No.1,Janvier 1967,Librairie Armand Colin,Paris,pp.1-22.

(4) Carl Iversen : Aspects of the Theory of International Capital Movements; Oxford University Press, London, 1936, p. 197. E.M.Bernstein : "Strategic Factors in the Balance of Payments Adjustment", Review of Economics and Statistics,Vol.XL (Suppl.), February 1958, pp. 133-142.

theory of Thornton and Mill assumed a gold standard, flexible prices and mobility of resources. Their formulation stemmed essentially from David Hume. The inflow of foreign funds would bring gold into the country and would therefore cause an increase in the money supply. Prices would then rise relative to other countries and this would render exports more expensive. Imports would at the same time rise. Those adjustments would induce the necessary current account deficit. Under the paper standard the transfer mechanism would lead to an eventual appreciation of the currency of the capital importing country in the absence of stabilising short-term capital movements.(1)

The most important flaws in the classical theory are not only that part of the money entering the capital importing economy may ultimately be spent abroad with reduced inflationary effects on the economy, but also that in the short run (and in contrast to the quantity theory of money which required conditions of full employment) changes in money did not always affect spending and vice-versa, since changes in employment produced altered price conditions.(2)

Modern theory, following Taussig's theoretical objections to previous concepts, postulates that price and monetary effects of capital movements are caused by changes in purchasing power rather than changes in prices and factor allocations. Taussig and Viner mostly based their arguments on the influence of gold movements upon relative price levels and thereby on the trade balance. The adjustment process would be fostered by the decline of import prices relative to export prices in the borrowing country, but also by the rise of domestic prices relative to both. This formulation neglected the direct equilibrating effect of the shifts in demand

(1) Jacob Viner: Studies in the Theory of International Trade. Harper and Bros., New York, 1937, Chapter VI, p. 290 ff. A. Bloomfield: Monetary Policy Under the International Gold Standard, 1880-1914, Federal Bank of N.Y., New York, 1959.

(2) Charles P. Kindleberger : International Economics. R.Irwin, . Homewood, Illinois, 1958, pp. 361-62.

resulting from balance of payments disturbances.(1)

I should note that it was Ohlin who looked first to income changes, treated the international capital movements as a process of transferring buying power, and examined them in relation to international trade.(2) Ohlin argued that the real cause of the balance of payments adjustment was the shift in "buying power" resulting from foreign borrowings or other disturbances. The repercussions of the initial foreign investment would be a higher level of income because of the multiplier effect. A portion only of this increase would be spent at home and the remaining (following the marginal propensity to import) would be spent abroad. Hence to the extent that this increase is spent abroad or is spent at home but with a rise in domestic expenditure which spills over into imports, the transfer takes place automatically with no change in prices. Two different transfer problems emerge : The question whether an autonomous capital movement will bring about a "real" transfer of goods and services (the classical transfer problem proper) and the question whether an autonomous capital movement will cause automatic forces to be called into motion to restore equilibrium.(3)

Lloyd Metzler's classic analysis showed that if the marginal propensity to save in the capital importing country is positive and if there is no accelerator or other positive slope to the investment schedule (i.e. if domestic investment is changed by no more than the amount of foreign capital transferred), then less than the full amount of the loan will be transferred by income changes.(4)

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(1) Jacob Viner : Canada's Balance of International Indebtedness, 1900-1913, Harvard University Press, Cambridge, Mass., 1924.
F.W. Taussig : International Trade, McMillan Co., New York, 1927.

(2) Bertil Ohlin : Interregional and International Trade, Harvard University Press, Cambridge, Mass., 1933, Part V, Chapter 20.

(3) Carl Iversen : Op.cit., p. 198.
Harry Johnson : Op.cit., p. 169 ff.

(4) Lloyd A. Metzler : "The Transfer Problem Reconsidered", Journal of Political Economy, Vol.L, June 1942, p. 397 ff.
W.W.Leontief : "Note on the Pure Theory of Capital Transfer", Explanations in Economics, New York, p. 88.

Following Keynes the "foreign trade multiplier" theory was accepted, and not only the fundamental role of shifts in demand (income) were emphasised (as in Ohlin), but also it was demonstrated how those shifts are generated following balance of payments disturbances. Changes in national income are essentially reflecting changes in real output and employment rather than in prices.(1)

From the point of view of the capital importing country the "capacity to absorb capital" has often been considered as a determining factor of the level of foreign capital. In other words the amount of foreign capital for which there is some reasonable assurance that it will be productively used in the economy is limited by the ability of the country to make necessary programming surveys, formulate projects, etc., so as to systematise and organise the investment activities.(2) This capacity is also determined by the antiinflationary monetary policies and the rate of mobilisation of domestic savings by the government, by the conditions prevailing in the local labour market and affecting its availability, mobility, etc., by the literacy of the population, the existence of managerial and technical skills, the quality and training of the labour force, and the abundance or scarcity of resources.(3) Another important factor is the effectiveness of the

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(1) For a modern analysis of the relationship of capital movements and international trade and the adjustment effects of income movements following changes in exchange rates see the following:
A.G. Ford: The Gold Standard, 1880-1914, Britain and Argentina, Clarendon Press, Oxford, 1962, p. 142 ff.
G.H. Borts : "A Theory of Long-Run International Capital Movements", Journal of Political Economy, August 1964, p. 341 ff.
M.C. Kemp : "The Gain from International Trade and Investment A Neo-Hechsher-Ohlin Approach", A.E.R., LVI, September 1966.
Ronald W. Jones : "International Capital Movements and the Theory of Tariffs and Trade", Quarterly Journal of Economics, Vol. LXXXI, No. 1, February 1967.

(2) Walter Krause : Economic Development, Wadsworth, San Francisco, 1961, pp. 253-59.

(3) John K. Galbraith : "A Positive Approach to Economic Aid", Foreign Affairs, XXXIX, April 1961, p. 444 ff.
Theodore Schultz : "Investment in Human Capital", A.E.R., LI, March 1961, p. 1 ff.
Willard L. Thorp : "Trade, Aid, or What", Economic Development, J. Hopkins, 1954, pp.167-8.

economic policies at home for balanced or unbalanced growth, taking advantage of external economies and of complementary and interdependent economic overhead projects in industry in the effort to achieve a general equilibrium.(1) Effective mobilisation of foreign capital to maximise its returns and minimise the costs taking account of the scale of priorities is also important. The net return from the employment of capital should be maximised and additional investment should be warranted by demand and cost conditions.(2)

Consequently the problem of absorption of foreign capital not only covers the problem of mere initial transfer in the traditional theory sense, but also covers the creation of import surplus via price or income effects, the productive utilisation of foreign capital, the returns in terms of profitability and the availability of supplementary and cooperating factors, with not only economic but also technical, organisational and sociological considerations.(3) Therefore the "absorptive capacity" at large is the ability of the receiving country to convince the foreign investor or lender that the real returns from the use of capital in the projected programme of investments are worth the costs involved and are greater than the returns from competing projects of borrowers in other countries. In a narrower sense the "absorptive capacity" is the amount of investment on which the schedule of expected marginal rate of return is equal to the "socially acceptable discount rate", with the supply of the other complementary factors considered as given.(4)

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(1) J.R.T. Hughes : "Foreign Trade and Balanced Growth", A.E.R., IL, May 1959, p. 330 ff.

(2) Henry G. Aubrey : "Investment Decisions in Underdeveloped Countries", Capital Formation and Economic Growth. Report of the National Bureau of Economic Research, Princeton University Press, 1955, p. 397 ff.

(3) Nurul Islam : "Recent Trends in the Theory of International Investment", Pakistan Economic Journal, September 1956, p.304.
J. Adler : Absorptive Capacity : The Concept and its Determinants, Brookings Institution, 1965, p. 5 ff.

(4) Ibid, p. 1 ff.
Edward S. Mason : Foreign Aid and Foreign Policy, Harper & Row, N.Y., 1964.

The notion of absorptive capacity conditioned by the effectiveness of foreign capital to bring results in the form of increments to the net national product, differs from the notion of the marginal efficiency of capital, given that additional capital could make possible the use of productive factors (such as labour) not previously employed. It is unfortunate that the term "unproductive capital" is being used to denote financial assistance for social overhead capital (such as education or health services) not directly resulting in an increase in the net national product.(1)

Another notion used occasionally instead of the absorptive capacity is the "capacity to repay", the debt-servicing capacity. If this falls below the absorptive capacity then increased investment is feasible only if aid in the form of grants or soft loans is given to the country.(2) The capacity to repay in the short-run is determined by the effect of foreign investment on the balance of external payments following an import-decreasing or export-increasing shift in the pattern of production.(3) In the long-run the capacity to repay is determined by the increase in productivity and the expansion of the economic potential of the country.

A large number of estimates of the aggregate level of the absorptive capacity of less developed countries in terms of the va-

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(1) Raymond F. Mikesell : "Capital Absorptive Capacity as a Limitation on Lending for Economic Development", U.S. Private and Government Investment Abroad. R.F. Mikesell, Ed., Eugene, Oregon, 1962, p. 365-66.

(2) Paul N. Rosenstein-Rodan : Op.cit., p. 137.
Willard L. Thorp : Op.cit., p. 167 ff.

(3) Charles P. Kindleberger : Economic Development. McGraw-Hill, Kogakusha, Tokyo, 1965, p. 328.
Dragoslav Avramovic : Economic Growth and External Debt. J.Hopkins Press, Baltimore, 1964, pp. 13 ff.
R.I. Gulhati : "The Need for Foreign Resources, Absorptive Capacity and Debt Servicing Capacity", J. Adler, Ed., Capital Movements and Economic Development, McMillan, London, 1967, p. 245 ff.

lue of total capital requirement for industrialisation and agricultural development have been presented. Two general methods of estimation have been employed giving similar results : either estimate the gap between the projected import and export figures, which effectively should be covered by capital imports, or alternatively from a given rate of growth and capital/output ratios to obtain the overall savings requirements of the economy, which gives the level of foreign savings after subtracting domestic savings. Unfortunately such methods have to be by their nature of an aggregate character and are unsuitable for an analysis of the manufacturing industry sector on its own, let alone dissagregated in individual component branches.

II. It is interesting to note that historically viewed in the context of twentieth century developments in some economies where entrepreneurial orientation is weak or failing, other institutional or political forms emerge, sometimes presented as socio-economic political philosophies, to accomplish what private enterprise fails to achieve in its economic and social objectives. Etatism has been one of such systems and communism another. The basis of those structures is largely affected by considerations of political standpoint, in the case of communism of a redistributory nature in the context of an one-party state. It is interesting to note that whilst Marxist economists have insisted that the export of monopolistic or "financial" capital[1] is an effective means of exploitation and colonisation, Marx himself described the success of capitalist expansion in the form of foreign capital and world markets in the form of exports in bringing about an expansion of output in the capital-receiving countries, but thought that the beneficiaries were the foreign investors alone.[2] He accepted nevertheless that the inflow of capital in a less developed economy "increased the consuming power" of the country for foreign goods.[3] But the increase in purchasing power for capital goods from abroad is surely one of the absolute essentials of the development process, and it can not be argued that capital imports are used to finance imports of consumer goods alone. Marx also believed that foreign capital would bring about new industrial techniques and material advancement in a traditional society and that once this level of capitalistic development had been attained socialism could be exported in those countries.[4] By contrast socialism in our days seems to be exported to countries which have not yet attained this level of capitalistic production.

(1) Rudolf Hilferding : Finance Capital. Russian Ed. (in English), Moskow, 1912.
(2) Karl Marx and Frederic Engels : Manifesto of the Communist Party. Leipzig, 1848, in Selected Works. Vol. I, Foreign Languages Publ. House, Moskow, 1962, pp. 35, 37-38.
(3) Karl Marx : Capital : A Critique of Political Economy. 1872, Foreign Languages Publ. House, Moskow, 1962, Vol. III, pp. 564, 251, 466-57.
(4) Ibid. p. 293.

We should note that when Marx predicted the collapse of the capitalistic system, over a century ago, his working economic model was that of a closed economy. It is interesting nevertheless, that the large international movements of capital, which culminated in our century in the controversial and often exploitative foreign monopolies, were already under way in Marx's own lifetime, bringing about political and economic results. Lenin in another classic criticism of "exploitive" and "parasitic" capital imperialism, thought that "the export of capital greatly affects and accelerates the development of capitalism in those countries to which it is exported",(1) i.e. the "colonised" countries.

A large share of the 19th century foreign investment went into the building of railways, that "great instrument of improvement", in Lord Dalhousie's memorable phrase. But even when the colonial powers retreated after the last war in front of the urge for independence, foreign investment still had to overcome the stigma of foreign exploitation by the sheer logic of economic expediency. Even today nevertheless, the critique of foreign private capital as the image of finance capitalism in its final "predatory" stage ("the latest phase of capitalist development") stemming from Hilferding to Rosa Luxembourg has a considerable emotional appeal in some underdeveloped countries.(2) Foreign investors are also regularly confronted by vigorous non-marxist nationalist sentiment, more particularly in such countries which have only recently achieved their

(1) Vladimir I. Lenin : "Imperialism, the Highest Stage of Capitalism : A Popular Outline", Petrograd, 1917, Reprinted in Collected Works, Volume XXII, Progress Publishers, Moskow, 1964, p. 243.

(2) Bernard Goodman : "The Political Economy of Private International Investment", Economic Development and Cultural Change, Volume 5, 1956-1957, Johnson Reprint Corporation, New York, 1963, p. 263 ff.

independence.(1)

The generally rigid approach of modern Soviet economists towards international capital movements has been that the capital transferred into another country is harmful for the receiving country economically not only in the case of exploitative foreign monopolies but also, and in particular, in the case of direct investments : no advantages accrue in the development of the dependent countries, or rather the costs of the investments are so high, that the countries are practically drained of their wealth. In the case of government loans and foreign capital entering the less developed economy in any form other than direct investments, conditions of dependence of the economy are claimed to be caused, coupled with heavy burdens in the balance of payments, etc. Those views often aired by professor A. Bechin(2) reflect the way of thinking of the Moskow Institute of World Economics and International

(1) W. McMahon Ball : Nationalism and Communism in East Asia, Melbourn University Press, Victoria, 1956.
K.M. Panikkar : Asia and Western Dominance, G.A. Allen and Unwin, London, 1959.
R. Koebner : "The Concept of Economic Imperialism", Economic History Review. 2, Second Series, 1949, p. 1 ff.
Manmohan Singh : "International Investment and Economic Development", Indian Economic Journal, Volume 5, 1958, p. 387 ff.
Leo Model : "The Politics of Private Foreign Investment", Foreign Affairs, Volume 45, No. 4, July 1967, p. 639 ff.

(2) For professor A. Bechin's views and for a heated discussion on them by economists of all persuations during an international conference see :
A. Bechin : "Forms of International Economic Relations which Influence Development of World Trade", International Trade Theory in a Developing World. Roy Harrod, Editor, MacMillan Co. Ltd., London, 1963, p. 230 ff., p. 486 ff.

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(1) W. McMahon Ball : Nationalism and Communism in East Asia, Melbourn University Press, Victoria, 1956.
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R. Koebner : "The Concept of Economic Imperialism", Economic History Review, 2, Second Series, 1949, p. 1 ff.
Manmohan Singh : "International Investment and Economic Development", Indian Economic Journal, Volume 5, 1958, p. 387 ff.
Leo Model : "The Politics of Private Foreign Investment", Foreign Affairs, Volume 45, No. 4, July 1967, p. 639 ff.

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Relations. It is interesting to note that the Soviet Union itself has recently allowed high-technology Western European and American establishments to build factories in some of the Soviet Rebublics.

Not only western marxist economists nevertheless have launched their polemics against foreign investment.(1) Non-marxist economists as well have supported similar views.(2) The exploitative nature of foreign investment presumably has never been entirely stamped out and the ugly image of some ninteenth century investments persists in some more modern forms. Even non-economic literature has sometimes been sensitive to this image, as in Bernard Shaw's play "The Apple Cart", where in Act I one of the actors says that England sends "... capital abroad to places where poverty and hardship still exist : in other words, where labour is cheap. We live in comfort on the imported profits of that capital".(3)

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(1) Alfonso Bauer Paiz : "How Yanqui (sic) Capital Works in Central America", Foreign Investment in Latin America, M.D. Bernstein, ed., A.A.Knopf, New York, 1966, p. 247 ff.
Pablo Gonzalez Casanova : "The Ideology of the U.S. Concerning Foreign Investments", Ibid, p. 234 ff.
Juan Jose Arevalo : The Shark and the Sardines, J. Cobb and R. Osegueda, Transl. L. Stuart, New York, 1961.
Ramon R.Rodrigues: Latin America,Victima del Dolar,S.Juan,P.Rico,1966.

(2) E.T. Penrose : "Profit Sharing Between Producing Countries and Oil Companies in the Middle East", Economic Journal, June 1959.
E.T. Penrose : "Foreign Investment and the Growth of the Firm", Ibid, Vol. LXVI, June 1956. The now-famous ironic statement "what's good for General Motors is good for the country" first appeared in the latter.
W. Rosenberg : "Capital Imports and Growth - The Case of New Zealand - Foreign Investment in New Zealand, 1840-1958", The Economic Journal, Vol. LXXI, March 1961.
D.J. Delivanis : "Mr. Rosenberg on Capital Imports and Growth", Ibid, December 1961.
R.J. Ball : "A Further Comment", Ibid, December 1961.
W. Rosenberg : "A Rejoinder", Ibid, December 1961.
Yuan-Ci-Wu : "International Capital Investment and the Development of Poor Countries", Ibid, Vol. LVI, March 1946.
J. Knapp : "Capital Exports and Growth", Ibid, Vol. LXVIII, September 1957.

(3) George Bernard Shaw : The Apple Cart, Constable and Co., London, 1930.

J.M. Keynes who had taken a leading part in shaping official thinking on government intervention against the recession in the 1930's which provided a bulkwark against marxist doctrines, was born in the year when Marx died. He was somewhat sceptical in the twenties about the value of overseas investment as a national asset and stated in 1922 that "the practice of foreign investment, as we know it now, is a very modern contrivance, a very unstable one, and only suited to peculiar circumstances",(1) but recognised the necessity in the post-war world of a vast supply of capital directed by a central body to countries in need of capital for development, and of substantial imports of private risk capital. These capital movements in Keynes' prophetic phrase would be dictated by "the obligation of humanity and the fear of Bolshevism".(2) He attached great importance to the fact that the psychological motives of the saver are different from those of the investor and he made a further distinction between the motives of the investor and the consumer. In a developing economy growth is sometimes fostered by just this kind of initial disparity between the intensity of the incentives to invest and to consume. The success of such growth policies, nevertheless, is further conditioned by one additional factor: the availability of foreign exchange to meet the balance of payments requirements. The role of foreign capital inflow in this respect is seen in the next part of this chapter.

(1) John Maynard Keynes : A Revision of the Treaty : Being a Sequel to the Economic Consequences of the Peace. MacMillan, London, 1922, p. 161.

(2) John Maynard Keynes : "Dr. Melchior : A Defeated Enemy, and my Early Beliefs", Two Memoirs. Published Posthumously, R. Hart-Davis, London, 1949, p. 56.

B'. The Balance of Capital Movements : Issues of Concept and Strucure

I. The "modern contrivance" of international capital movements was generally appraised and intuitively accepted as desirable in pre-World War II Greece, if not very properly comprehended. The diminished stock of productive equipment and the scarcity of physical capital in the country resulted in an urgent demand for capital in liquid monetary form, for purchasing power in a Schumpeterian sense and for maintenace of external equilibrium. Abstention from consumption nevertheless, was never advocated effectively enough in a country with broken economy and the stabilisation and development efforts of the country largely depended on foreign relief loans and balancing capital movements.

TABLE VII

Aggregate Net Capital Movements: Selected Countries, 1929-1938

	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Greece	+45	+34	+37	+12	-4	+10	+12	+29	+28	+22
Poland	+68	+3	-1	-4	-5	-30	-16	-6	+39	N.A.
Chechoslovakia	-25	-9	+25	+9	+10	-5	-6	-8	-12	N.A.
Hungary	+38	+22	+37	+4	-6	-3	-8	-19	-30	N.A.
Bulgaria	+21	+1	+5	+1	-1	-	-8	-11	N.A.	N.A.
Yugoslavia	-13	+35	+32	+7	-1	+6	+6	-3	N.A.	N.A.
Turkey	+50	-6	+3	-3	+15	N.A.	N.A.	N.A.	N.A.	N.A.

Note: All entries in million U.S. dollars, rounded off to the nearest integer. N.A. = not available.

Source: United Nations: International Capital Movements During the Inter-War Period. Lake Success, Oct. 1949, p. 12.
Raymond F. Mikesell: 1962, Op.cit., p. 42.
For Chechoslovakia and additional data on Hungary and Poland see
V.N. Bandera: Foreign Capital as an Instrument of National Economic Policy, Martinus Nijhoff, The Hague, 1968, pp. 22-3.
Also see: David Mitrany, Ed., Economic Development in S.E. Europe, Political and Economic Planning, Publ., London, 1945.
Demosthenes Stephanides: The Influx of Foreign Capital, (In Greek), School of Law and Economics, University of Thessaloniki, 1930.

The dependence of the Greek economy on foreign capital (mainly British, but also American and Dutch through the league of Nations

Loans), during the inter-war period was already considerable, as compared with other economies in eastern Europe, where inflows of capital were curtailed much more drastically than in Greece after the depression of 1931.(1) The dependence on foreign capital was accentuated even further in the post-war period. We note nevertheless the difference in the composition of the capital inflow during the 1947-1952 period, when foreign aid and not private or bank capital was of paramount importance. The subsequent diminishing in importance of the U.S. aid, which was drastically reduced in 1953 and had practically come to an end by 1964, and the end of war reparations as an important entry by the middle fifties (with only one further large installment in 1962) resulted in an increasing dependence of foreign finance on private capital and from 1959 onwards on government borrowing from abroad.

TABLE VIII

Capital Inflow: 1947-1952

	1947	1948	1949	1950	1951	1952
Trade Deficit	-178.0	-298.7	-282.8	-309.2	-324.1	-162.1
Net Invisibles	32.0	35.2	26.2	30.4	37.0	48.8
Net Capital Inflow	40.5	54.3	3.0	5.3	5.3	6.8
Private	4.3	6.8	5.2	7.1	6.0	9.4
Bank etc.	20.0	17.6	-	-	-	-
State Loans	21.0	42.0	2.0	-	-	-
Amortisation etc.	-5.0	-12.1	-4.2	-1.8	-0.7	-2.6
Aid & Reparations	86.7	202.5	267.0	295.2	292.0	126.7
U.S. Aid	26.3	188.5	258.7	266.4	250.5	100.2
Other Donations	57.5	8.3	-	-	-	-
War Reparations	2.9	5.7	8.3	27.8	31.5	26.5

Note: All entries in million U.S. dollars. Other Donations include U.N.R.R.A. financed imports.
Source: Compiled from data in Bank of Greece: The Greek Economy in the Year 1966, Athens, 1967, p. 108 ff.

The importance of foreign capital as defined by the capital account in the balance of payments becomes obvious only after 1954. Private venture capital foreign or local could not be attracted to a

(1) Royal Institute of International Affairs: The Problem of International Investment. Oxford University Press, 1937, p. 247.

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country torn by war, inflation and extensive controls. At times actual dis-investment of fixed capital was taking place, either to be invested in gold or be converted to flight capital and be exported abroad through the black market.(1)

TABLE IX

	Number of Loans	Number of Companies	Value in £ million
Agriculture and Fisheries	526	-	53.2
Manufacturing Industry	252	151	24.8
Textiles	4	3	0.1
Chemicals	56	25	8.3
Steel-Roll Mills	4	2	2.1
Steel Sheets	3	1	0.8
Cement	7	2	4.6
Building Material	48	40	0.25
Munitions	1	1	2.6
Miscellaneous	10	9	0.4
Other Repairs	32	15	2.6

Source: U.S. Operations Mission in Greece: The American Aid Programs in Greece. Athens, 1954, p. 16.

The bulk of loans in the pre-1953 period came through AMAG (American Mission for Aid to Greece) and the Greek Central Loan Committee, and some 40 per cent went to basic manufacturing industries able to produce from local raw materials at a cost competitiveto that of imports.(2) The problem of repayment in dollars for those loans given the uneconomic structure of the Greek economy and the cost of successive devaluation became acute and foreclosures amounted to over 25 per cent of all industrial investments. Despite this the significance of those early investments can not be disputed and their breakdown as of 1954 is given in Table IX.

The current account deficit in the 1953-66 period reflected,

(1) Howard S. Ellis and Associates: Op.cit., p. 272.
Economic Co-operation Administration: Greece: Country Study, Washington, D.C., 1949. p. 17.

(2) William C. Ladd: Report on the Co-operation and Organization of the Economic Development Financing Organization, U.S. Operation Mission to Greece, Athens, May 1960, Chapter 2.

and may to a certain extent have been brought about by the capital account surplus. The steady increase in the deficit of the trade balance was maintained and even accelerated,[1] with an average increase in exports of about 10 per cent per annum, as compared with an average increase of 13.4 per cent for imports. Not only did economic growth divert products and factors from potential exports to supply a growing domestic demand, but also given the relatively inelastic demand for the country's exports, the projected growth rate of income and imports exceeded that of the export receipts, a typical case of a "programmatic gap" between desired and actual imports in the Machlup sense.

(1) See Table X .

II. The inflow of foreign capital into the Greek economy has taken a number of forms. In more recent years, with the decline in foreign aid it has increasingly taken the form of government borrowing, directly from the government of another country or from a private sources abroad. Only rarely (if at all) the inflow was by floating bonds in money markets abroad.

Historically speaking government borrowing has been used internationally quite frequently in the last few centuries to finance the needs of industry. England borrowed from Holland in the seventeenth century and even earlier the Medici were financing during the high Renaissance through their bank in Florence a large number of foreign governments. In the nineteenth centuary the U.S.A. borrowed from England at a time when the city of London was becoming the finance centre of the world. The German state loan to Greece amounting to $ 12.7 m. in 1959, $ 11.1 m. in 1960 and $ 24.4 m. in 1961, was agreed on such direct government borrowing. This was quite a different kind of inflow from the compensation paid by the U.K. government in the year 1959 for the confiscation of Greek ships during the second world war.

In the late fifties and early sixties loans mutually agreeable to the U.S. AID agency and Greek companies ostensibly (although not necessarily) improving the distribution and utilisation of U.S. agricultural products were granted, financed from the drachma proceeds of sales of such products in Greece. Repayment was agreed in drachmas. The loans granted from 1959-1963 went mostly to petrol companies to improve storage and distribution facilities, to chemical industries and textiles, and one each to food, wood, machinery and electrical appliances industries. The total amount of those disbursements under section 104(e) P.L. 480 Title I (the so-called

TABLE XI

Capital Movements: 1953-1966

Note: All entries in million drachmas at current prices.

The exchange rate computed at 30 drachmas per U.S. dollar throughout the period.

Commercial credit from abroad, clearings and private exchanges (including emigrant and labour remittances), all net capital transfers to the public (including international aid, gifts, donations, loans repayable in drachmas, war reparations and indemnities), and the value of capital equipment (machinery) imported under L.D. 2687/1953, are not included.

Source: Compiled from a selection of data in:

Bank of Greece: Bulletin of Foreign Transactions of Greece, Economic Research Direction, Balance of Payments Section, Athens, various issues.

" : Monthly Statistical Bulletin, Economic Research Dept., Athens, various issues.

Ministry of Economic Coordination: National Accounts of Greece, 1948-1965, National Accounts Direction, Issue No. 16, Athens, 1967.

Ibid. 1960-1967. Issue No. 18, Athens, 1969.

National Statistical Service of Greece: Monthly Statistical Bulletin, Athens, various issues.

National Statistical Service of Greece: National Accounts, 1948-1970, Athens, 1972.

TABLE XI (Continued)

Year:		1953	1954	1955	1956	1957	1958	1959
Total Private	(In	345	555	708	774	903	1128	1578
	(Out	6	132	120	255	147	33	60
	(Net	339	423	588	519	756	1095	1518
2687/1953	(In	-	150	150	90	114	255	132
	(Out	-	-	27	72	27	33	6
	(Net	-	150	123	18	87	222	126
Other Re-export-able	(In	-	-	-	-	-	-	291
	(Out	-	-	-	-	-	-	-
	(Net	-	-	-	-	-	-	291
Business loans etc.	(In	-	-	-	-	-	150	243
	(Out	-	-	-	-	-	-	9
	(Net	-	-	-	-	-	150	234
Other non-re-export-able	(In	345	405	558	684	789	723	912
	(Out	6	132	93	183	120	-	45
	(Net	339	273	465	501	669	723	867
Total Bank	(In	-	21	72	138	327	414	663
	(Out	-	-	15	60	90	225	363
	(Net	-	21	57	78	237	189	300
Short-term deposits of 2687/1953	(In	-	21	72	138	327	414	399
	(Out	-	-	15	60	90	225	363
	(Net	-	21	57	78	237	189	36
Other Bank loans etc.	(In	-	-	-	-	-	-	264
	(Out	-	-	-	-	-	-	-
	(Net	-	-	-	-	-	-	264
Total Public & Public Co.	(In	-	-	-	-	-	-	459
	(Out	192	84	84	-	81	240	237
	(Net	-192	-84	-84	-	-81	-240	222
Public	(In	-	-	-	-	-	-	459
	(Out	192	84	84	-	81	240	237
	(Net	-192	-84	-84	-	-81	-240	222
Public Co.	(In	-	-	-	-	-	-	-
	(Out	-	-	-	-	-	-	-
	(Net	-	-	-	-	-	-	-
Total Gross Inflow		345	576	780	912	1230	1542	2700
Total Gross Outflow		198	216	219	315	318	498	660
NET INFLOW		147	360	561	597	912	1044	2040

TABLE XI (Continued)

Year:		1960	1961	1962	1963	1964	1965	1966
Total Private	(In	1527	1737	2124	2778	3198	4440	4176
	(Out	111	114	105	240	297	363	300
	(Net	1416	1623	2019	2538	2901	4077	3876
2687/1953	(In	177	219	435	843	1134	1950	1410
	(Out	9	9	12	15	57	60	60
	(Net	168	210	423	828	1077	1890	1350
Other re-export-able	(In	156	42	-	-	-	-	-
	(Out	-	-	-	-	-	-	-
	(Net	156	42	-	-	-	-	-
Business loans etc.	(In	150	297	390	483	309	570	660
	(Out	15	15	15	78	78	120	90
	(Net	135	282	375	405	231	450	570
Other non-re-export-able	(In	1044	1179	1299	1452	1755	1920	2106
	(Out	87	90	88	147	162	183	150
	(Net	957	1089	1221	1305	1593	1737	1956
Total Bank	(In	282	438	432	594	531	459	582
	(Out	375	426	282	444	297	366	228
	(Net	-93	12	150	150	234	93	354
Short-term deposits of 2687/1953	(In	153	309	390	414	336	342	558
	(Out	300	192	204	315	240	249	168
	(Net	-147	117	186	99	96	93	390
Other Bank loans etc.	(In	129	129	42	180	195	117	24
	(Out	75	234	78	129	57	117	60
	(Net	54	-105	-36	51	138	0	-36
Total Public & Public Co.	(In	453	1041	468	45	1425	1659	2694
	(Out	651	150	222	276	360	264	408
	(Net	-198	891	246	-231	1065	1395	2286
Public	(In	453	1041	216	45	1230	771	2391
	(Out	153	84	141	195	210	120	276
	(Net	300	957	75	-150	1020	651	2115
Public Co.	(In	-	-	252	-	195	888	303
	(Out	498	66	81	81	150	144	132
	(Net	-498	-66	171	-81	45	744	171
Total Gross Inflow		2262	3216	3024	3417	5154	6558	7452
Total Gross Outflow		1137	690	609	960	954	993	936
NET INFLOW		1125	2526	2415	2457	4200	5565	6516

"Cooley Amendment" loans) was about 200 million drachmas. Their contribution to the expansion of productive capacity despite their rather generous terms was only marginal as part of those loans was only used as working capital and most of the rest for the expansion of distribution systems, improving sales rather than productive capacity.(1) Additional to the above $ 20 m. were approved for the Power Co. and two $ 5 m. loans for two Greek development banks after 1962.(2)

Government borrowings in the case of Greece were usually general purpose loans. A few have been specifically floated for a particular project or "earmarked" for some other purpose (tied loans), where out of the revenue of the project, interest and repayment of capital would be possible. Predictably (and very unfortunately) few were channeled directly into the manufacturing industry. In most cases such loans easily led to bilateral trade agreements. Loans for instance from a Consortium for a development plan loan by the OECD countries, although not very significant over the whole period, amounted in 1964 to about $13 m. Only two members of the organisation, the U.S.A. and France contributed (the U.S. Aid Programme loan by $ 9.3 m. and the French by $ 3.7 m.) and those loans were tied to finance imports of certain commodities from the lending countries. Their nature, consequently, has been rather restrictive. Other such loans in the 1962/1966 period include loans from the European Investment Bank for road construction works of the order of $ 17 m., energy (electricity) of the order of $ 6m, and irrigation - land improvements of the order of $ 15.3 m.

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(1) G. Coutsoumaris and Associates: Analysis and Assessment of the Economic Effects of the U.S.PL 480 Program in Greece. Center of Planning and Economic Research, Athens, 1965, p. 178 ff. p. 183 ff.
(2) D. Psilos and R. Westebbe: Op.cit. p. 31.

We may distinguish the flow of international funds following loans from "multilateral" public institutions, from "unilateral" government loans. In the first category we find loans such as those from the International Bank for Reconstruction and Development, the World Bank, and to a lesser extent from the International Finance Corporation, the U.N. International Development Association and the I.M.F. on certain types of international transfers only. This category of international investment is particularly attractive to the developing nations, as less foreign control and interference is involved and the capital is procured at a smaller direct cost to the borrower than in the case of other forms of investment, the transfer being determined not purely by economic but by political considerations as well.(1)

Greece could have expected more in terms of loans from such international organisations. Loans from the World Bank or the IBRD for instance, with their much easier terms would have been very welcome , but obviously "political" arguments and priorities must have weighed more than any economic or sociological considerations in restricting any such loans to Greece. This of course must be a better explanation for the failure of such agencies to support the development of the Greek industrial infrastructure to any substantial degree, rather than the stereotype "credit risk" arguments.

In the second category of "unilateral" government loans, we have governments which offer guarantees and loans mainly through the Export-Import Bank, the Development Loan Fund and the already

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(1) Raymond F. Mikesell: Public International Lending for Development , New York, William Letwin, 1966, Appendix A., p. 215 ff. For an analysis of IMF rules and effects of increased convertibility on international financing see:
Georg P. Nicoletopoulos: "International Financing in Conditions of Greater Currency Convertibility", International Financing and Investment, J.F. McDaniels, Ed., The World Community Association, New York, 1964 p. 39 ff.

mentioned loans from the Agency for International Development. Capital imports through such government borrowing are usually considered as a source of foreign exchange to be in the long run a more stabilising force for the economy than private investment, as they are often undertaken in accordance with an overall economic development plan.(1) By planning on a long-term basis, a government can borrow and build up foreign exchange reserves in anticipation of future foreign exchange shortages and enable the continuation of investment programmes even in the case of a sudden fall in the foreign exchange receipts. In the developing Greek manufacturing industry, so much dependent upon essential capital equipment from overseas, such stability was vitally important even if it involved some extra interest burden. The risk of "political" considerations influencing the government expenditure of loan funds could not unfortunately be ruled out; not infrequently the capital transferred was channeled not to productive investment in industry but simply to finance ordinary budget deficits(2). An Import-Export Bank loan nevertheless to the Greek Railways in 1962, to the tune of $ 2.4m., has specifically been used for the purchase of capital equipment and for operational expansion. Loans from the Manufacturer's Hanover Bank were also of the same nature, and the Public Power Co. borrowed $ 8.2m. in 1965, and small sums in 1964 and 1966 from those sources, exclusively for investments in infrastructure.

Governments could borrow in the international capital markets from private lenders even before 1929, and they still borrow today, but on a much more limited scale, mostly to finance permanent improvements . Exchange controls and the lower level of availability

(1) Robert E. Asher: Grants, Loans, and Local Currencies: Their Role in Foreign Aid. Washington D.C., The Brookings Institution, 1961, pp. 51-54.
(2) Nurul Islam: Op.cit. p. 59 ff.

of private savings, together with the unfavourable reactions of the general public and the press towards such loans, had initially prevented Greece from borrowing from private lenders (with the exception of private banks) to any significant degree. Borrowing from foreign private banks, nevertheless, was becoming more common practice towards the end of the period. Such borrowing from big American banks in 1964 brought in $ 27 m. and some of those funds were made available for the modernisation of the manufacturing industry through commercial bank loans.

The development needs of the Greek government required capital from non-self-liquidating forms of expenditure, and there has been considerable difficulty in agreeing such intergovernmental loans. Private Business borrowing from corporate forms of business organisations in Greece, or from stock exchanges by floating securities or from other specialised investment institutions yielded small amounts of capital, whose economic significance to the manufacturing industry was definitely less important than the significance and the potential of portfolio and direct investment.

Various types of joint enterprises are found in different countries where the foreign investors participate with local capital in various degrees. Mexico, India and Pakistan, have quite a large experience in such ventures, and it seems that local investors in such countries prefer to participate in enterprises sponsored by foreign investors to domestic firms, however well managed the local firms may be.(1) The main motivation for portfolio investment is that it allows profits on a basis not available to the investors in their own country. Portfolio investors are sometimes

(1) M. Habibullah: "Role of Foreign Capital in the Economic Development of Pakistan", Pakistan Economic Journal. July-September 1960, p. 182.

described as "money investors", and although they have the desire to stay in the investment project indefinitely, they wish to retain some liquidity.(1) They usually invest in the form of purchases of foreign bonds and securities, whether they are private individuals or institutions. This type of investment allows the setting up of sinking funds, budgeting of debt charges in foreign exchange, and planning of repatriation of capital.(2) On the other hand, this type of investment is sometimes less certain to lead to productive investment, in particular when the issuer is a public agency such as a municipality.

Essentially, portfolio investment represents a loan of money. It includes bonds and non-controlling equity investment, the investor usually holding shares of stock in a corporation. The securities the investor acquires can be either private or government. In the case of private securities the investor holds only a small part of the stock issue of a given enterprise and is therefore unable to control effectively the enterprise from abroad. It is largely a non-controlling investment, unlike the direct investment where the investor not only provides capital, but also obtains control of the enterprise or participates in its management.(3)

The decision to invest in portfolio is based on a calculation of return versus risk as compared with alternative opportunities

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(1) V.E. Rockhill: "U.S. Private Investments Overseas", Financing Foreign Operations. Report No. 23, International Management Division, New York, 1958, p. 114 ff.

(2) Alec A. Rozental: "International Finanne Corporation and Private Foreign Investments", Economic Development ann Cultural Change. Vol. 5, 1956-57, Johnson Reprint Co. Ltd., New York, 1953, p. 279.
United Nations: International Capital Movements during the Interwar Period. New York, 1949, p. 25 ff.

(3) Walter Krause: International Economics. Houghton Mifflin Co., Boston, 1954, p. 451.
August Maffry: "Direct versus Portfolio Investment in the Balance of Payments", American Economic Association, Papers and Proceedings, May 1954.

elsewhere. This type of investment requires safety and stability in the capital importing economy and certainty of transfer of profits and repatriation of capital.(1) The risks for the investor are higher because his ignorance of the existing conditions prevents him in many cases from a correct evaluation of the creditworthiness of the borrowers. There is also the risk of uncertainties of the exchange rates and of the political set up. In addition to this, such investment capital is not accompanied by entrepreneurial activities and skills and therefore its usefulness depends on the efficiency of domestic entrepreneurs and the standard of managerial and technical know-how. Consequently there is a substantial interest-differential to overcome the greater risk and to attract foreign investment.(2) The effectiveness of such interest-differential in motivating a capital flow from low interest-rate countries to high interest-rate ones has, nevertheless, been challenged in theory as a mechanistic view and Philip Bell in 1962 has shown that portfolio capital movements are insensitive to interest-rate differentials.(3)

In Greece more than half of the private foreign capital imported under the L.D. 2687/1953 before the end of 1962 represented participation in the capital of Greek enterprises and the rest loans to Greek enterprises, or direct investment by foreigners. Portfolio participation was either equity or bond investment with only small capital participation based on fixed-interest lending. This trend has been reversed after 1962 when large projects undertaken increased the share of direct foreign investors. Then the share of

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(1) Donald B. Marsh: World Trade and Investment, New York, 1951, p. 57.
(2) Lothar Heuhne: "The Role of Private, Public and International Capital Exports to Underdeveloped Countries", Public Finance, No. 4/1962, p. 317 ff.
(3) Philip Bell: "Private Capital Movements and the U.S. Balanced Payments Position" U.S. Congress, Joint Economic Committee, Factors Affecting the U.S. Balance of Payments, U.S. Government Printing, Washington D.C., 1962.

participation capital actually decreased. The particular structure of the Greek investment-financing mechanism and the inadequacy of the internal capital market has contributed to the phenomenon of only 76 corporations having shares listed in the Athens Stock Exchange out of 600 industrial corporations in the year 1965. Several factors have contributed to this phenomenon: the low dividend yields of the few firms which paid annual dividends at all (between 1957 and 1963 only 31 registered companies out of 77 paid dividends annually, as compared with over 90 per cent of all firms in the New York Stock Exchange in 1956), resulting in non-availability of attractive stocks and bonds; the reluctance of the family-controlled corporate enterprises to issue securities; and the negative attitude of the general public towards transactions in the stock exchange on sociological and moral grounds. No doubt the situation resulted in an increased share of direct foreign investments at the expense of portfolio investments.

In the case of direct investment we have personal or corporate ownership of physical assets. The investors make an evaluation of profit opportunities in the acquisition of old enterprises or the creation of new affiliates and branches. The profitability of direct investment is a function of the adequacy of demand or market, of the relative ease or difficulty of transferring abroad debt-service payments etc. In the case of a branch plant the anticipated contribution to the overall profitability of the parent concern has to be assessed.(1) The direct investor carries control over the enterprise via his share in equity capital. This form of direct subsidiaries or affiliates of the corporation in the lending countries, involves either establishing a new concern, or acquiring an

(1) John P. Young: The International Economy, New York, Ronald Press, 1942, p. 387.
Nurul Islam: Op.cit., pp. 24, 59.

already existing foreign enterprise as a subsidiary. Hence the direct investment, otherwise known as "equity capital" investment, involves foreign operation and ownership of the enterprises invested in, rather than mere creditorship.

A number of advantages are generally attributed to direct foreign investments as distinct from portfolio investments and loans. Mostly they are free of rigid interest and amortisation requirements which affect international loans. They also spread and promote modern technology and more efficient management methods. And they eventually create a demand for real resources which results in an increase in the pace of economic development.(1)

Taking those points in turn more analytically, one has first to establish that direct investment requires no payment of principal, the dividend remittances do not start immediately but after income is generated, and the dividends fluctuate with the company's earnings. We consequently do not have, as in the case of portfolio investment, the drawback of utilising fixed-interest securities. On the other hand, certain disadvantages are usually attributed to direct investment: The rates of return are higher on average than in portfolio investment, and there is the problem of reinvested earnings in the early stages.(2) But the real crucial point of difference between the two types of investment is the degree of foreign control. The participation of foreign entrepreneurs in

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(1) W.Y. Elliot: The Political Economy of American Foreign Policy. New York, Henry Holt and Co., 1955, p. 328.
E. Collado and J. Bennet: "Private Investment and Economic Development", Foreign Affairs, Vol. 35, July 1957, pp. 635-8.
Ragnar Nurkse: Op.cit., p. 82.
N. Dunning: American Investment in the British Manufacturing Industry. London, Allen and Unwin, 1958, p. 304.

(2) Edith Penrose: "Foreign Investment and the Growth of the Firm", Economic Journal, Vol. VXVI, June 1956, p. 220.
J. Franc Gaston: Obstacles to Direct Foreign Investment, National Industrial Conference Board, New York, 1951.

financing the country's economy is less in the case of portfolio investment, where they can more easily be bought out and where at any rate they exercise less control. In the case of direct investment they have management, control, and ownership of the enterprise. Some arguments based on national interest have risen in Greece, in that it is not always in the best advantage of the economy to have an industrial sector partially under foreign control, sometimes in a position of monopolistic strength and under contracts of disputed equity.

The foreign affiliates may in some cases compete with the big "parent" companies in export markets in third countries. It is by no means clear to what extent this displaces the capital-exporting country's exports which would otherwise have been made.(1) As a general rule in what concerns manufacturing enterprises, large companies based in highly developed countries, spend at home more than their foreign counterparts (subsidiaries) on new product development (often labeled as "research-oriented" or "innovational" investment). Considerably more is spend abroad by the affiliates for production for an easily accessible international market and with production process which relies more heavily on labour inputs and which is as a result not so highly capital intensive. Textiles and goods of the electronics industry are rapidly coming under the latter category in recent years.(2) This is in line with B. Ohlin's theory that different goods require different factor-inputs and different countries have different factor-endowments

(1) Leo Model: "The Politics of Private Foreign Investment", Foreign Affairs, Vol. 45, No. 4, July 1967, p. 642.

(2) Raymond Vernon: "International Investment and International Trade in the Product Cycle", The Quarterly Journal of Economics, Vol. LXXX, May 1966, No. 2, Harvard Univ., Cambridge, Mass., pp. 190-207.
William Bruber, Dileep Mehta, Raymond Vernon: "The Research and Development Factor in International Trade and International Investment of U.S. Industries", The Journal of Political Economy, Vol. 75, Feb. 1967, No. 1, Univ. of Chicago Press, p. 20 ff.

favouring factor substitution.

Substantial growth has occurred internationally in the level of the flow of private capital during the post-war period, but despite a considerable improvement in the compilation of balance of payments statistics, an analysis of private capital flows is not always accurate, a number of omissions, debit and credit errors etc., affecting the estimates in Greece as in most less developed economies. Those inaccuracies also stem from differences of timing, coverage and definition. Sometimes transactions of public corporations which are instruments of central government are included in the statistics for private investment. Transactions of public corporations whose functions do not differ substantially from those of private corporations are often classified with the public sector. Liabilities of one sector, such as the central government sector, are generally included not in the guarantor's debt but rather in the debtor's sector. Therefore meaningful comparisons of international statistics are occasionally subject to a larger margin of error when those entries are considered.

The main bulk of portfolio and direct investment from abroad came into the economy under the regulations of L.D. 2687 which was enacted in November 1953, and amounted by the end of 1966 to $ 376,593,887. This figure covers the private gross capital flow of long-term capital. If we include short-term deposits and the value of capital equipment imported under L.D. 2687/1953, the inflow totals $ 439,074,987. This is by no means the grand total of private foreign investments, as the existing information is incomplete, since all Greek-financed construction components are not recorded, although the Ministry of Economic Coordination which screens all applications keeps lists of approved projects and of imported capital as well.

We should note that only "safe" and sound applications were approved by the "selective" Ministry, and again many of those approved were not implemented or were withdrawn. It has been suggested that many of the withdrawals were applications made by Greek nationals on speculation, in anticipation of foreign finance which did not materialise. Other withdrawals were attributed to administrative delays, and the approval of other applications was withheld by the Ministry under the law and for a period of five years, in protection of previous foreign investments in competitive activities.(1)

The increase in the inflow of 1958 may in part be due to statistical corrections made the same year or due to statistical discrepancies in general. Up to that year the increase in inflow of capital under L.D. 2687 was channeled mainly to shipbuilding, electrical enterprises, and the Olympic Airways. After that year data becomes more reliable, since only after this year was the capital transfer content of the invisibles statistically calculated. The long-term movements did not increase in 1959, when the total fell to half the level of 1958. Short-term deposits did not increase overall because of the significant increase of outflow on this account. For the period 1955-1959 loans under L.D. 2687 averaged about $ 5 m. a year, not a very significant contribution to the needs of the economy. For the period 1st Nov. 1953 to end of 1959 applications for over $ 167 m. were submitted, but only about $ 78 m. were approved, and just over $ 28 m. were actually imported. 62 per cent of the imported capital came from the U.S.A. This share was very much reduced in the sixties.

(1) G.C. Archibald: Investment and Technical Change in Greek Manufacturing. Leture Series, No. 15, Center of Economic Research, Athens, 1964, p. 32 ff.

Most of the increase in approved investments in 1960 was from the agreement with Pechiney-Compadec companies of France for an aluminium industry ($ 59 m.). A continuing uncertainty concerning the connection of the Greek economy with the EEC may have discouraged foreign investors from importing more capital for the approved projects. By 1961 aluminium together with cellulose, nitrogen and asbestos were the important new industrial units using foreign finance. In the following two years a very considerable increase in the inflow of private foreign capital was due to the new oil distillery of the ESSO-Th. Pappas group, bringing in over $ 55 m. spread over several years, with an approval for up to $ 110 m. An accelerated rate of increase in the inflow of such private venture capital in 1965 marked the completion of several major projects, with a resulting small decrease in 1966.

The flow of resources as defined under L.D. 2687/1953 was not confined to capital alone. Capital equipment in the form of machinery, accessories, spare parts, etc., was brought in by the capital-importing investors. Those goods were granted exemption from custom duties, or paid lowered levies in the context of tax accommodations servings as incentives. The tax loss of the treasury in drachmas should be counterbalanced in this context to the gain of the economy in terms of aquisition of expensive equipment at no cost in foreign exchange (See Table XIII).

Most of the private foreign capital inflow into the Greek economy was channeled to private individuals or firms rather than to the banking sector. Bank capital included loans of $ 1.8 m. in 1957, $ 9.8 m. in 1958 and $ 5.9 m. in 1959 from the European Payment Union. A $ 4.8 m. National Bank of Greece loan to a Cypriot enterprise is listed in the Bank capital out-flow for the year 1961. European bank loans of the order of $ 12.5 m. for 1960 and 1961

were used exclusively for the construction of a nitrogen plant and of the first sugar plant (Larissa: German bank loan of $ 3.2 m.).

Most of the increase in short-term deposits of L.D. 2687/1953 in 1966 came from imports of capital by two American banks to increase the liquid assets of their Athens branches.

TABLE XIII

Inflow of Capital Equipment under L.D. 2687/1953

	Value of Items Imported	Total of Import Tax Relief
1957	9,000	N.A.
1958	30,000	N.A.
1959	12,000	N.A.
1960	46,909	5,130
1961	18,997	2,919
1962	72,631	12,064
1963	184,759	23,870
1964	536,183	94,745
1965	1,226,455	322,022
1966	633,915	157,503

Note: Value and duties in thousand drachmas at current prices. No imports prior to 1957. Tax relief figures for 1957-1959 not available.

Source: 1960-1966 entries from National Statistical Service of Greece: Monthly Statistical Bulletin of Public Finance, Various Issues, Athens, 1962 to 1967.
1957-1959 figures computed from dollar entries in Bank of Greece: The Greek Economy in the Year 1959, Athens, 1960, Appendix table 15.

Capital inflow on behalf of private individuals or firms includes "Business Loans", which cover mostly cash requirements of petrol and other companies established prior to or without the benefits of L.D. 2687/1953, and are the result of restrictions imposed on their credit facilities. Before 1958 they could import petrol and a number of other commodities and be credited for the import duties, which after the opening of the state distillery in 1958 they had to pay in cash.

"Other Non-Re-Exportable Capital" includes mainly transfers

by Greek nationals under pressure of expulsion in Turkey, Egypt, etc., investing predominantly in dwellings and in land property, but seldom in the manufacturing industry. It is capital which is not expected to be re-exported, with obvious favourable balance of payments implications. It reached a high point in the four years 1958-61 when emmigrant capital invested in dwellings amounted to $ 129 m., i.e. more than half the total inflow of private capital ($ 240 m.).

Commercial Credit from abroad is not included in the preceding table of capita movements. The expansion of commercial credit in recent years reflects the convenience in the procedure of acquiring them when compared with the difficulties of obtaining approval for direct loans. Commercial credit has a particular appeal

TABLE XIV

Commercial Credit from Abroad (Net Inflow)

1953	1954	1955	1956	1957	1958	1959
216	267	384	738	1,014	549	-135
1960	1961	1962	1963	1964	1965	1966
234	180	954	696	963	1,134	1,362

Note: All entries in million drachmas at current prices.
Source: Converted from dollar entries in
Bank of Greece: The Greek Economy in the Year 1966, Op.cit., p. 108 ff.

for short-term finance to old firms of rather restricted expansion capacity. The new capital-intensive industries of greater expansion potential generally prefer, by contrast, finance through direct loans or equity capital. It is therefore obvious that the contribution of commercial credit to long-term capacity-augmenting, technical-progress-creating expansion and technology was rather limited and its contribution should be assessed in terms of short-term convenience rather than in terms of a substantial long-term role in a planned process to achieve self-sustained growth.

III. Most of the foreign finance of the Greek manufacturing industry came through L.D. 2689/1953. The law provided for a special ministerial committee to screen applications for investment. After the approval of the conditions and the terms of the investment the consent of the foreign investor was required for any alteration. The procedure of approvals of the committee has been criticised for granting on occasions approvals to Greek firms on speculation, before any foreign loan was actually secured,(1) which accounted perhaps for some of the divergence between the value of approved applications and the value of realised investments; it has also been criticised for administrative delays, which accounted for some of the withdrawals of applications from the part of despairing firms finding possibly alternative investment outlets in other countries. A quantitative assessment of any such effects is clearly impossible, but obviously there was ground for some improvement in that direction.

Capital, according to the L.D. 2687/53 could only be repatriated one year after the commencement of operations, at the rate of an annual maximum of 10 per cent of the imported capital(2) Remittance of dividends and profits could not exceed 12 per cent per annum of imported capital. 10 per cent annually was allowed for interest on loan capital, and the actual amount exported could be averaged over a period of years. The L.D. 4171/1961 ruled that dividends could be remitted on the repatriated portion of capital originally imported under L.D. 2687/53 at a rate not exceeding 6 per cent of the principal involved, provided such dividends are less than 8 per cent of the $ value of the firms annual exports.

The subsequent L.D. 4256/1962 increased the amount of profits

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(1) G.C. Archibald: Op.cit., p. 32.
Howard S. Ellis and Associates: Op.cit., p. 285-6.
(2) A.A. Fatouros: Government Guarantees to Foreign Investors, Columbia Univ.Press,N.York,1962,p.124.

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and capital that could be re-exported to 70 per cent of the foreign exchange receipts of the investment, and increased to 20 per cent the allowance for interest on loans, again not exceeding 70 per cent of the foreign exchange receipts. The annual rate on loan capital was also increased to 20 per cent, provided such loans were not more than double the amount of the firms capital stock. The actual maximum rate of remittance as stipulated by the law is not particularly high by international standards, although there were some who desired to block profits in excess of a lower limit, considered even the existing rates as unjustly high, representing an exploitation of local resources and labour, and pointed out that some of the very high rates granted in other recipient countries were of academic interest only, as it was unlikely that profitability of capital in those countries would allow remittances of that order. Some arrangement to ensure that investments were made not on a "quick profit" but on a permanent interest basis would be desirable in Greece; perhaps a longer gestation period before the firms were allowed to export their profits. The Philippines had introduced an extremely interesting system of determination of the rate of transfer of profits on the basis of the company's "social productivity rating". Australia on the other hand only allowed repatriation of capital in case of "real need", or if the operations were suspended. Japan allowed repatriation only after notice and a two-years deferment period, and then by annual instalment over a period of five years.(1)

There were special provisions regarding shipping in L.D. 2687/53 which for the purposes of the law was regarded as imported foreign capital regardless of the nationality of the shipowner. Faci-

(1) Raymond F. Mikesell: Op.cit., p. 488.
Wolfgang G. Friedmann, Richard C. Pugh, Eds.: Legal Aspects of Foreign Investment. Boston, Mas., 1959, p. 440, 32.
Nobutane Kiuchi: "Capital Importation in Postwar Japan", Asahi Evening News. June 23, 1959, p. 6.
The second and third references quoted in the first.

lities were also granted for short-term finance, and time deposits in foreign currency of not less than $ 100,000 by persons permanently residing abroad or foreign corporations were to be repayable in the same currency within no less than six months of the importation and at a maximum eight per cent annual interest rate, later fixed at four per cent for short-term and five per cent for long-term (over two years) time deposits. (Council of Ministers, Resolution No. 90, June 17, 1959).

Certain areas of economic activity were reserved by L.D. 2687/53 for state operation, the particular case to be determined by the Cabinet. (Article 14, para. 2). We note that in many other countries there was a more specific mention of such activities. For instance in Argentina transport, communications, fuel, power, petroleum and steel were specifically excluded from foreign participation; in Brazil much of the transport system, petroleum and petrochemicals and part of the steel and electricity industries; in Mexico the oil and petro-chemical industries, mining, electric power and railways, with other sectors to be controlled by Mexican nationals only: transport-communications, advertising, fisheries, rubber products and some more chemicals; in Denmark the operation of railways, tele-communications, distilleries, sugar refineries and the real-estate business; in Belgium railways, airlines and electricity. In Japan foreign investments have always been unreservedly unwelcome and have been discouraged in most key sectors of the economy, including among the lighter industries tobacco manufacturing. India strongly discouraged foreign investment in trading activities (sales and distribution), banking, insurance, plantations and the cotton and jute industries. Italy tried to discourage foreign investments in banking, insurance, mining, power

plants, sea and air transport.(1)

Many countries restricted their tax benefits to a select number of so-called "pioneer industries", particularly in newly created states. Such industries, sometimes specified by statute, were generally identified as activities not previously carried on in the country or not already producing enough to satisfy the current or expected requirements.(2) In other countries tax benefits accrued to industries exploiting the national resources of the country,(3) or to "new" industries, or even to the "necessary" ones only.

Some countries encouraged assembly-type "screwdriver" industries, with more benefits to those which import fewer components, but others insisted on the manufacture of components and specifically excluded packaging and assembly-type operations. A lower limit on the size of the firms was sometimes stipulated before they qualified for tax benefits. The limit was either in terms of capital outlays or in terms of numbers of employees.

One has to remember that in some cases foreign capital in Greece was not simply not taxed, but it was also effectively subsidised in a number of ways and not only through the tariff system. Government spending on construction, building, supplying overhead capital for roads, harbours, electricity supply etc., either free or below cost. The most celebrated example in this respect was the state concessions in the price of electricity supplied to the French-sponsored Pechiney aluminium factory. Another was the effective monopoly concessions granted to certain foreign investors, such as the Pirelli rubber products, the Esso oil refinery, and the Olympic

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(1) Westminster Bank Ltd.,: These are Your Markets: Latin America I; Denmark; Belgium and Luxemburg; Japan; India; Italy; London, April 1964, p. 21, 44, 67; January 1968, p. 35; December 1966, p. 60; June 1954, p. 35; October 1967, p. 34; November 1965, p. 49, respectively.

(2) George E. Lent: "Tax Incentives for Investment in Developing Countries", IMF Staff Papers, July 1967, Vol. XIV, No. 2, pp. 258-62.

Airways. Additional effective protection under the law implied an undertaking by the state to withhold further approvals in competitive activities for up to five years. It has been suggested that there were grounds to suspect that this enhancement of an effective monopolistic (or oligopolistic) situation had in some cases lasted "de facto" for more than five years, had prevented many subsequent investments, and accounted for some of the withdrawals of applications for investments made before the foreign investors discovered that such a protective clause was still applying.(1)

The fact that each approval of application for foreign investment in Greece is a "unique document", with a completely different set of terms and provisions according to its merits, makes it extremely difficult to determine conclusively the success or failure of the Greek investment-incentive programme, not simply because it would be impossible to assess in an aggregate level the combined effect of such diverse concessions, but also because we have no means to establish what the inflow would have been without incentives. Moreover part of the imported capital was Greek. It is clearly the attitude of the investors which one would have to analyse, but the information which would allow an appraisal of what a typically desirable investment climate would be is very scarce, and no questionnaires seeking information on investments were ever issued in Greece.

The large number of divergent opinions expressed in Greece concerning the practical effect of international capital in financing industrial expansion, is explained to the extent that foreign finance has been connected at different times with different development stages, political ideologies, and conflicting interests in the

(1) G.C. Archibald: Op.cit., pp. 32-3.

country. Even where international investment was generally considered an economic necessity, dissenting views have been presented in estimating the impact of various kinds of inflows with reference to harmonious development, economic expansion of the industry, and acceleration of the rate of technological change. The real difficulty in such cases was that at times, what appeared to be one country's or one firm's right under the international law, looked like intervention for the other party concerned; and one's concept of efficiency often appeared to be the other's concept of exploitation. This makes an assessment of the varied overall contribution of foreign investment to manufacturing development in Greece a very disputed topic indeed.

C'. Calculation of Foreign Capital Inflow by Sector of the Manufacturing Industry

The sources of information on foreign capital inflow into the Greek manufacturing industry are unfortunately limited and somewhat contradictory. They are confined to official publications of the Ministry of Economic Coordination and official published and unpublished information at the Bank of Greece. It is very unfortunate that the methods and definitions used by those two institutions are different and those differences became all the more striking during the last years of our period. Divergent estimates that could no longer be concealed were the "cause celebre" of mutual criticisms which resulted in the year 1967 in the abrupt suspension of all Ministry of Coordination estimates for actual private capital imports ("realised"foreign investments).

As information from the Ministry of Coordination formed the bulk of my estimates for the early part of the period, Bank data becoming all important only in the last three or four years and in certain industries only, it is necessary to outline the largely unknown and unpublished evidence that has been presented to me by Ministry and Bank officials in relation to their divergent approach. It is one of the central issues in this thesis to establish consistent investment series for foreign-financed industrial projects.

We have reported earlier that most of the foreign finance of the Greek manufacturing industry in terms of private capital came through L.D. 2689/1953.[1] The Ministry issued an annual mimeographed report which kept a running total of "approved" and "realised" foreign investments year by year. The entries are given

(1) See p. 70 above.
(2) Ministry of Coordination, Division of Foreign Capital: Long-Term Investment According to L.D. 2687/1953 "On Investment and Protection of Foreign Capital" (in Greek), Athens, various issues, 1961 to 1967 annually (mimeographed).

"by firm", and the name and activity of each firm is recorded for all foreign investors (firms and individuals) including Greeks from abroad. The nature of the project is briefly (and sometimes cryptically) stated, and as the Ministry has by law to approve each foreign-financed project, a running total by firm of "approved" as against "realised" estimates is given year by year for every application not simply in manufacturing but in all other activities as well. On aggregate for the entire economy we have the value of application in U.S.$, the value of applications withdrawn or refused, and the value of those approved. Withdrawals are generally attributed to Greek firms applying "on spec", before a foreign loan or foreign partnership was actually secured, or before the foreign investor had investigated the market. I have already noted that considerable delays in the approval process may have been instrumental for some withdrawals. Rejections occur mostly in the case where the protection of the law is already granted to a similar activity established in the country, sometimes the ministry being effectively blackmailed by interested parties in rejecting approvals of competitive enterprises,(1) although the extent of such behind-the-scene pressures can never be established, and any such information is invariably based on rumors. Officially the ministry could withhold approval from competitive activities for up to five years.

The Ministry of Coordination publications do not give us aggregates by branch of the industry of "realised" foreign investments. What we are given are the detailed "by firm" annual entries described above, and annual estimates of aggregate "approvals" for the entire economy. A detailed analysis of the annual "by firm" report of the ministry can provide information on which we can base our estimates of year-by-year inflow by firm.

(1) John Campbell and Philip Sherrard : Op.cit., pp. 376-77.
(2) G.C.Archibald : Op.cit., Lecture Series No. 15, p. 19.

A first obvious disadvantage of the ministry classification as far as our purpose is concerned is that the entries in $ USA are given "cumulative", i.e. for each firm an annual figure is presented not of that particular year's inflow but of the grand total of capital the firm has imported since its application was approved. It was necessary therefore in order to arrive at annual entries from the added up totals to subtract from the latest figures those of the previous year to obtain some annual breakdown for each firm. But as the ministry publication is not available for the period in the fifties, it then becomes necessary for that early period to use any alternative information available or make certain assumptions as to the distribution of "realised" investment over time. My own sources of information in this case to supplement the ministry entries were (in order of significance) information from individual firms concerned, information from the press and other publications of that time, and information from the Bank of Greece. Information of the first kind was not made available to the author by other than a very few firms following personal contacts. The contemporary press I found forwarding ample but not reliable information which had to be selected from a generally misinformed bundle of gossip, rumors, and hearsay evidence. Even less could be expected from the few scattered entries in the Greek professional or scientific statistical publications of the time. Bank of Greece information was also scarce for the beginning of the period and was unfortunately compiled under alternative definitions. As a result where no other information was available I stipulated that as a general rule investment for those early years was realised in a period of two years from the date of approval given by the ministry publication, so that half of the amount of the complete transfer in question was allocated in

the year of the approval and the other half in the following year, unless there was evidence from other sources mentioned above, when corrections were made.

A second obvious disadvantage of the data as presented by the ministry is that some investors were bringing in funds to be channeled to more than one activity, so that one had to obtain information from the same kind of three sources as to the allocation of each ministry entry. In this respect Bank information often gave useful hints as to the direction of investments.(1)

The divergence between the Ministry and the Bank information is largely explained by the fact that the ministry accepted an investment as realised from the moment the guarantee documents were submitted to the Bank of Greece and the mechanical equipment had arrived in port, while the Bank wanted the custom authorities to clear the equipment first. The time lags involved were not terribly important for most of the period but became of paramount importance towards the end of the period, when huge foreign investments produced a backlog of equipment that waited to be cleared. Such differences were felt particularly in branches ISIC numbers 29-32, 34, and 38. In branch 29-32 (leather-plastics-rubber-chemicals-petrol) to give an example the giant ESSO corporation building a complex of oil refineries, chemical byproducts processing, and steelworks was bringing in foreign capital for which we present the different Bank and Ministry estimations for the four last years.

ESSO CAPITAL INFLOW (In Drachmas, at Current Prices)

	Bank of Greece Estimates	Ministry of Coordination Estimates
1963	214 050 000	211 050 000
1964	386 319 000	383 319 000
1965	772 506 750	1 072 506 700
1956	195 000 000	691 124 250

The Bank estimate gives a further 496 124 000 dr. imported by ESSO to finance a steel furnace in 1966 in addition to the amount stated in the tables.

(1) See p. 74 above for some comments on such statistical discrepancies.

Further discrepancies have occured in branch 34 estimates (basic metal industries) where the French Pechiney Co. have been financing a large aluminium and alumina concern using bauxite mined in Greece with the Greek government bearing the cost of very large hydroelectric installations providing electricity (perhaps up to one-third of the Public Electricity Corporation's 1963 capacity) at concessional rates. I record below the relevant conflicting Bank and Ministry capital import versions.

PECHINEY CO. CAPITAL INFLOW (In Drachmas, at Current Prices)

	Bank of Greece Estimates	Ministry of Coordination Estimates
1963	132 180 000	156 180 000
1964	181 500 000	521 226 480
1965	416 250 000	1 006 500 000
1966	36 000 000	1 717 500 000

Significant further differences also appear in recording capital inflows for Niarchos' Hellenic Shipyards in branch 38 (transport equipment). There is no doubt that the Bank estimates are more in keeping with the National Accounts totals and of course discontinuing of the ministry estimates would tend to confirm by inference the somewhat inconsistent nature of some of their later entries.(1)

The method I adopted in reconciling those discrepancies is a balanced judgement I arrived at after having discussed in person the details of each approach with officials at both the Bank and the Ministry. It is a compromise solution in that for the four last years I use the Ministry entries for all small and medium-sized investments together with the Bank estimates for the three large investors named above (ESSO, Pechiney, and Hellenic Shipyards) to modify the ministry entries for those three particular concerns. Special attention was paid to make certain that the

(1) I note that the Bank of Greece estimates are unpublished and I have been granted special permission to obtain those and other estimates from individual files on each firm kept in the Bank. I wish to thank the Bank officials who made this research possible. The Ministry unit has also been helpful with information, despite numerous reshuffles it has suffered prior to its eventual demise at a later date, when its functions were taken over by a much larger Ministry of National Economy.

modified calculation of grand totals I present are not inconsistent with the grand totals of gross capital formation of the industry calculated independently and issued eslewhere by the National Statistical Service of Greece. In some cases it was obvious that the ministry entries were inconsistent with the Statistical Service calculations.

The estimates of individual firm inflows (arrived at annually as described by subtracting in a backward chronologically order the up to date totals in each case from those of the same firm in the subsequent year) were then grouped together for each year in totals for firms of the same kind of activities in a breakdown dictated more by the National Accounts breakdown of the industry in eleven groups. All individual annual entries therefore were finally summed up to eleven such sectoral totals as given in the Table that follows. In fact the entries were converted from the initial $ USA values of the Ministry or Bank entries to drachmas at the then prevailing exchange rate and then calculated as a final step at constant 1958 prices as given in Table XV .

The need of adjustment so that total entries conform with the National Accounts totals arisesfrom inconsistencies in the ministry accounting and from differences in various quarters in definition between foreign capital inflow and foreign realised investmant. Clearly the amount of investment can occasionally be at odds with the annual inflow estimates, and a few major projects could have a large effect on the time-profile of the investment series. Realisation of certain projects could be spread over a period longer than the annual span allowed for by our balance-of-payments-based estimates. In the few cases where this happened I redistributed our entries to such an effect that the time profile of big project series is not very dissimilar to that of the National Statistical Service total investment estimates. I only had to make such ajustments in three cases: the 1963 branch 29-32 inflow and the 1963 branch 38 inflow were distributed over two

TABLE XV

Foreign Investment, 1953 - 1966 :

by Branch of the Manufacturing Industry

(In Drachmas, at Constant 1958 Prices)

	20-22 Food-Drink-Tobacco	23 Textiles	24 Clothing-Footwear	25-26 Wood-Cork-Furniture	27-28 Paper-Printing	29-32 Leather-Rubber-Plastics-Chemicals-Petrol
1953	-	-	-	-	-	-
1954	-	-	-	-	17 033 333	-
1955	-	797 232	-	-	16 422 996	1 339 351
1956	3 550 578	739 703	-	-	20 415 823	15 009 476
1957	9 413 467	-	-	-	20 234 556	14 377 678
1958	6 946 710	-	-	15 600 000	7 959 090	2 700 000
1959	7 319 973	-	2 834 731	20 782 885	7 114 531	53 279 133
1960	7 693 533	-	2 735 703	6 599 485	27 290 811	95 564 736
1961	1 510 795	-	-	-	26 574 377	87 897 860
1962	21 532 389	-	21 306 229	1 138 403	2 251 911	64 455 544
1963	29 579 471	34 054 049	3 864 010	6 226 222	1 821 082	280 733 650
1964	14 114 753	84 256 067	20 773 012	29 557 062	45 560 085	178 536 000
1965	24 521 699	20 587 302	4 558 084	2 240 199	18 205 626	1 632 538 000
1966	19 401 567	14 148 408	11 372 649	7 495 829	4 541 819	317 981 000

	33 Non-metallic Minerals	34 Basic Metal Industries	35-37 Metal Prod.-Machinery-Electr.Equipm.	38 Transport Equipment	39 Miscellaneous Industries	20-39 Total Manufacturing Industry
1953	-	-	-	-	-	-
1954	-	-	-	-	-	17 033 333
1955	-	-	1 339 319	-	-	19 898 898
1956	-	-	1 982 376	-	-	41 697 956
1957	-	-	23 093 786	21 977 953	-	89 097 440
1958	7 500 000	-	24 790 860	246 086 820	-	311 583 480
1959	6 704 156	-	18 025 733	108 513 110	-	231 688 788
1960	9 559 496	-	19 625 626	169 774 990	433 495	339 277 930
1961	11 702 630	25 200 927	49 975 303	739 773	2 072 776	205 674 441
1962	4 261 245	36 327 884	6 785 451	1 263 907	1 469 008	160 791 971
1963	13 872 440	143 700 470	15 916 600	68 945 895	4 100 863	602 814 762
1964	30 677 927	-	20 544 930	127 008 000	1 318 096	552 345 932
1965	27 407 583	1 082 753 000	47 200 348	33 049 000	1 321 183	2 894 382 024
1966	198 527 100	153 568 190	34 333 000	-	-	761 369 562

Source : Derived from Appendix to Chapter Four, Para.C'.
Original information from Ministry of Coordination: Long-Term Investments Under L.D. 2687/1953 "On Investment and Protection of Foreign Capital", (in Greek), Athens, various issues, 1961 to 1967 (mimeographed).

Note : On the method of estimate see text, p. 85-91.

consecutive years, and the 1964 branch 34 entry was lumped together with that of 1965.

The results on Table XV embodying the methods of estimation described in this chapter are surprising in their apparently inconsistent flow of funds in most branches, with irregular fluctuations in investment generated perhaps by the existence of a small market unable to sustain more than the occasional large project, rather than by autonomous fluctuations in the interest of foreign investors dictated by external circumstances. Where there is a comparatively larger market (as in the food-drink industries and chemicals) or a remarkably deficient Greek productive structure despite an increasing demand (such as in metal products and electrical appliances), a more consistent flow of foreign capital over the years is obvious.

Other considerations may have also affected the time-profile of foreign investment structure as well. One such may have been the export and import standing of the industry in relation to total demand. The effects of foreign investment in export-creation and import-substitution will be considered in a section that follows, and the question of whether any such policies of export-creation and import-substitution had any bearing on the flow and direction of foreign investment will be raised. But first I shall consider the nature and magnitude of the outflow of funds directly related to foreign capital investments.

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APPENDIX TO CHAPTER FOUR, PARA.C'.

Distribution of Foreign Investments by

Sector of the Manufacturing Industry.

Long-Term Investments Under L.D. 2687/1953 "On Investment and Protection of Foreign Capital". "Approved" Investments, followed by Actual Capital Inflows Only.

20-22 Food Drink Tobacco				23 Textiles		24 Clothing Footwear		25-26 Wood Cork Furniture	
Special Code No.	Year of Approval	Special Code No.	Year of Approval	Special Code No.	Year of Approval	Special Code No.	Year of Approval	Special Code No.	Year of Approval
130	1956	622	1964	113 a	1955	260	1959	198	1958
130	1959	622	1966	477	1962	260	1966	279	1959
130	1962	623	1964	477	1965	260	1966	279	1961
156	1956	678	1964	511	1963	452	1962	401	1962
156	1958	678	1966	520	1963	500	1963	495	1953
163	1957	724	1965	520	1963	523	1963	495	1964
163	1958			547	1963	536	1963	495	1966
166	1957			600	1964	649	1965	495	1966
181	1957			613	1964	677	1964	680	1964
181	1958			613	1964	704	1965	680	1966
257	1959			613	1966	723	1965		
270	1959			634	1964				
270	1959			700	1965				
277	1959			701	1965				
277	1962			713	1965				
277	1963			750	1965				
332	1960								
332	1962								
335	1960								
406	1961								
406	1963								
406	1965								
406	1966								
412	1961								
431	1962								
449	1962								
476	1963								
476	1964								
476	1965								
476	1965								
476	1966								
476	1966								
503	1963								
503	1963								
503	1964								
503	1966								
503	1966								
558	1963								
561	1963								

27-28
Paper
Printing

Special Code No.	Year of Approval
154	1956
214	1958
214	1960
214	1966
233	1958
302	1960
310	1960
346	1960
346	1963
428	1962
428	1965
499	1963
618	1964
721	1965

29-32
Leather-Rubber
Plastics
Chemicals-Petrol

Special Code No.	Year of Approval
64	1955
132	1956
150	1956
155	1956
161	1956
193	1957
221	1959
221	1962
227	1958
227	1960
227	1965
227	1965
252	1959
252	1964
261	1959
275	1959
275	1961
275	1963
275	1963
275	1964
281	1959
290	1960
301	1960
303	1960
303	1965
326	1960
326	1966
339	1960
339	1961
339	1961
339	1962
341	1960
356	1960
364	1961
364	1962
364	1963
375	1961
380	1961
383	1961
383	1962
388	1962
388	1965
398	1966
399	1961
411	1962
413	1962
432	1962
432	1963
455	1964
459	1962
459	1963
459	1964
459	1966
459	1966
465	1962
496	1962
506	1963
506	1964
507	1963
507	1965
507	1965
507	1965
507	1966
514	1963
514	1966
529	1963
529	1965
544	1963
548	1963
562	1965
568	1963
568	1966
575	1963
575	1964
579	1964
579	1966
579	1966
584	1963
607	1964
609	1964
624	1964
633	1964
635	1964
636	1964
645	1964
645	1966
648	1964
656	1964
667	1964
675	1965
695	1965
699	1966
708	1965
732	1965
743	1966
752	1966
752	1966
758	1966
790	1966

33
Non-metallic
Minerals

Special Code No.	Year of Approval
231	1958
231	1960
231	1960
236	1959
236	1959
372	1961
372	1961
372	1962
390	1962
434	1962
434	1966
434	1966
468	1962
489	1963
489	1964
510	1963
510	1964
510	1965
527	1963
527	1966
540	1963
540	1965
564	1964
580	1964
610	1964
610	1965
625	1965
642	1965
683	1964
703	1965
703	1966

34
Basic
Metal
Industries

Special Code No.	Year of Approval
343	1960
343	1966
498	1963
498	1965
710	1965

35-37 Metal Products Machinery Electr. Equipment		38 Transport Equipment		39 Miscellaneous Industries	
Special Code No.	Year of Approval	Special Code No.	Year of Approval	Special Code No.	Year of Approval
62	1955	142	1957	323	1960
140	1956	142	1958	354	1961
158	1957	146	1956	354	1962
158	1957	146	1959	354	1963
158	1959	146	1960	373	1961
158	1959	146	1963	481	1963
158	1961	146	1964	538	1963
158	1961	146	1964	538	1964
158	1962	146	1965	550	1963
190	1957	146	1965	550	1965
197	1957	226	1959	626	1964
220	1958	360	1961		
220	1963	360	1963		
262	1959	471	1962		
273	1959	526	1963		
273	1962				
282	1959				
282	1961				
282	1962				
282	1963				
282	1963				
349	1961				
350	1960				
350	1961				
352	1963				
352	1963				
371	1961				
371	1963				
497	1962				
521	1963				
557	1963				
567	1963				
572	1963				
595	1963				
606	1965				
606	1966				
628	1964				
629	1964				
639	1965				
664	1964				
679	1964				
679	1956				
774	1966				
791	1966				
791	1965				
807	1966				

NOTE TO APPENDIX TO CHAPTER FOUR, PARA. C'.

Entries denote code numbers of such "approved" foreign investments only as have been followed by actual capital imports, even where not the entire amount of "approved" foreign investment was imported during the period ("realised"). 'Years of "approval" do not necessarily coincide with years of capital import.

On the terminology and methodology of computing the actual capital import by year see Chapter Four, Para. C' in text. Part of entry No. 496 (29-32) allocated to branch 34.

SOURCES

Cited special code numbers and years of approval from

Ministry of Coordination, General Direction I, Foreign Capital Service: Long-Term Investments Under L.D. 2687/1953 "On Investment and Protection of Foreign Capital", Part A', Data up to 31 Dec. 1966, Athens, January 1967 (mimeographed).

CHAPTER FIVE

Estimation and Qualification of the Direct Balance of Payments Effects of Long-Term Foreign Capital Inflow

A. The Relationship Between the Inflow and the Outflow of Funds in Theory

Anyone who has sought to understand the shifts in international capital movements in the post-war years has been hindered occasionally by a sense of a certain inadequacy of the available analytical tools. In my study I do not examine speculative and flight movements of capital. Capital movements are mainly viewed as means of capital formation and are treated as movements of factors of production. Therefore I accept that capital moves in a country to create productive equipment which would comprise durable social-overhead projects.

Capital flows into the country where the "marginal efficiency of capital" is the highest. The marginal efficiency of capital, on the other hand is an ex ante concept, and therefore it is not measured specifically. It was defined by Keynes as the rate of discount which would just equalise the present value of the series of annuities given by the returns expected from a capital asset during its life to its supply price.(1) Consequently it is defined as "marginal" because it refers only to yields resulting from additions to capital. It is therefore in this context that rational investment behaviour will equate the marginal efficiency of capital with the rate of interest.

The interest rate is one of the costs of increasing the capital stock. If given, then the above relationship becomes one between the expected value of the marginal product and marginal cost

(1) John Maynard Keynes : The General Theory of Employment Interest and Money. Macmillan, London, 1936.

of capital. The latter equals the price or average cost of capital, and therefore the marginal efficiency of capital is the expected marginal product of capital in money terms.

Our expectations concerning the marginal product of capital cannot be based solely on the law of diminishing returns. The marginal product of capital is a decreasing function of the stock of capital, but only in the case of constant availability of the other factors of production and in the case of given demand structure and the "state of arts". The scarcity of capital which may be occasioned by the demand or the supply side, should be compared with the scarcity of the other factors of production.(1)

Capital of course, does not flow into the international channels for philanthropy, not private capital at least. Capital-receiving countries therefore, find themselves in debt on their trade balance position, since the inflow of foreign funds may be expected to generate sooner or later an outflow, as loans and investments are subject to the payment of amortisation and interest (or dividents). A continuous policy of foreign investment would therefore produce a relationship between the inflow and the outflow of funds.

One could generally expect as a rule that in the long-run, with continuing inflows, amortisation charges and interest payments will approach and eventually exceed the flow of new investment. The typical stages of evolution of international indebtedness of a capital importing country are often described as follows :

We first have the immature debtor stage of a country which finds it necessary to import more than it exports in order to purchase the consumer or investment goods it needs. An import surplus prevails. In the mature debtor stage which follows the country still receives foreign capital but the cumulative dividends, interest

(1) Bertil Ohlin : Interregional and International Trade, Harvard University Press, Cambridge, Mass., 1933, pp. 17-19.

and amortisation of the old investments are larger than the current inflow of capital. The economy therefore faces a net capital outflow and should in the interest of balanced payments and growth achieve a surplus instead of a deficit in the current account.

The immature creditor stage is defined as the one where the net outflow continues, not only in the form of payments for old investments, but also in the form of investing and lending abroad. Finally in the mature creditor stage the economy starts receiving interest payments and dividen s from the investments abroad, which are now paying off with a resulting net inflow of capital.(1) The validity of this theoretical formulation found favour with a number of economists mainly in the USA during the postwar period of European reconstruction.(2)

An excess of outflow of funds (always with respect to loans/service charges) over the inflow in an immature or young debtor country as Greece is as far as the balance in the manufacturing industry sector alone is concerned (something I shall show in the second part of this chapter) will or will not appear depending on the relative magnitudes of the rate of growth of foreign capital inflows and the rate of interest/dividends/amortisation. A sufficiently fast growth of new foreign investment may therefore postpone for a very long period of time the emergence of a net excess of annual service charges over annual inflow from abroad. Whether this kind of situation is feasible or politically desirable remains of course a different matter.

In the case where a sufficiently rapid rise in foreign investment is not feasible or desirable, then a judicious amorti-

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(1) The current account registers then an adjusting surplus. See Paul Samuelson : Economics. McGraw-Hill, New York, 1964.

(2) Jacob Viner : "International Finance in the Post-war World", Journal of Political Economy. April 1943, pp. 105-6.
Hall B. Lary : "The Domestic Effects of Foreign Investment", A.E.R., Papers and Proceedings, May 1946, p. 672 ff.
Randal Hinshaw : "Foreign Investment and American Employment", Ibid, p. 661 ff.
Norman S. Buchanan : International Investment and Domestic Welfare. H. Holt, New York, 1955, p. 166 ff., 206 ff.

sation policy may postpone the arrival of an excess of service charges over the inflow. The backflows of two foreign investments with the same rates of interest, growing at unequal rates of increase, which have different amortisation rates, can be expected to behave in quite a different way. Investments with higher amortisation rates will reach a state of excess of annual service charges over further inflows before those with the lower amortisation rates. At a later stage of course the loan with the lower amortisation rates will generate a surplus of charges over inflow which will reach parity with the other and produce an increasing outflow surplus over inflow thereafter until paid off. Even an effective and intelligent amortisation policy therefore may only postpone by itself some of the balance of payments burdens, in so far as the foreign investments comprise of loans which are amortised.(1) Further indirect balance of payments benefits of the foreign investment are necessary to offset the advent of excessive burdens, and those are related to the use of the foreign funds.

Leaving this latter point for a further chapter we note that in what concerns amortisation policies, we can only negotiate alternative amortisation schedules on new investments, given that renegotiation of old amortisation arrangements is not always feasible. As an example the ESSO contract was thought in certain quarters to be concessionary in that prices were fixed in the original form at a level handicapping the industry and establishing a monopoly preventing the government from purchasing any substantial quantities of such petrol refinery products at cheaper prices as might be offered in eastern European markets. The equity of the contract was challenged by the opposition which when in power managed to improve slightly upon some of the terms, but significantly not those bearing on the service charges or profit transfers.

(1) Evsey D. Domar : "The Effect of Foreign Investment on the Balance of Payments", A.E.R., Vol. 40, Dec. 1950, p. 806 ff.

Additionally, even the best amortisation policy can only have partial influence, since its effectiveness can be seriously hindered by the irregularity of direct investment profit transfers which can either swell or depress investment service charges.(1) Whether the firms exercise their rights regarding amortisation and profit transfers is something on which it is difficult to generalise, particularly in view of the option most firms are allowed in effectively presenting funds to be exported either under the cover of maximum amortisation rates or alternatively maximum permitted profit rates depending on the political sensitivities of the moment or their own tax schemes. We note that only portfolio investment has a definite rate of amortisation or carries stipulation of a period after which it has to be repaid. There exists no such provision in the case of direct investment. In this latter case repatriation of capital occurs only where the firm is sold or liquidated, but otherwise a large amount of discretion can be exercised by the direct investor regarding his timing of remittances abroad.

(1) D. Finch: "Investment Service of Underdeveloped Countries", I.M.F. Staff Papers, Sept. 1951.

B. Data, Sources and Results

The relationship between the inflow and the outflow of foreign investment funds in the case of the Greek manufacturing industry can be expressed as the ratio of new gross investment to gross outflow, consisting of amortisation plus interest payments. This "investment/service" ratio defines the magnitude of the debt service burden, and shows to what extent the foreign investment programme affects the pattern of the Greek balance of payments on the current account.

The main difficulty in assessing the situation arises from the lack of availability of published data. Having established a consistent time series of inflow of long-term foreign capital by branch of the manufacturing industry in the previous chapter, we now turn our attention to the outflow of funds generated by this inflow. The only published information is scattered in the sources of Table XI above. Those sources I have used to compile the consistent time series I present in this table. Unfortunately the available information is unsuitable for use in this section for two fundamental reasons. First the figures do not cover the inflow and outflow of long-term capital alone (long-term investments) which are of interest to us, but also movements of short-term loans and deposits, without any breakdown between the two. Second the figures are given for the entire economy and do not distinguish the manufacturing industry separately, let alone the individual branches of the industry.

I have therefore found it necessary to establish a time series on interest remission (covering remittances of dividends and profits) and on repatriation of capital originally imported under L.D. 2787/1953, and the subsequent amendments L.D. 4171/1961, and L.D. 4256/1962. A considerable amount of research into unpublished material was necessary to achieve this.

The only institutional source in Greece holding relevant information is the Bank of Greece. Unfortunately not only has the information never been published, but it also proved exceedingly difficult to locate and a systematic tabulation involved a considerable effort through masses of irrelevant documents.

I wish to express my thanks to the governor and directors of the Bank of Greece who kindly granted me permission to do this research, and the Bank employees who kindly assisted me much more than one would expect from the call of duty. I should also establish that this research was undertaken with the explicit understanding that the following three conditions be fulfilled: First that the material I have reviewed remains the exclusive property of the Bank of Greece. Second that what I present here is not an official Bank version but figures I present on my own judgement after being shown information in the files of the Bank of Greece. Three that I do not reveal information on specific firms but only present grand totals by branch of the manufacturing industry.

To arrive at those totals one has to go through a great number of files at the Balance of Payments Direction/Foreign Capital Division of the Bank . The files contain information by firm on practically all Greek and foreign firms having some dealings with abroad on the capital account. In the first instance all kinds of firms are listed, not simply those in the manufacturing industry sector. The firms are often listed by the name of the owner and no reference is made as to the activity of the firm, so that the selection of the entries relevant to the industry was fairly complicated with all kinds of cross references continuously necessary with a large number of diverse sources to establish the nature of their activities. Furthermore limited companies or "societes anonymes" are sometimes known to have changed titles during the period under consideration. Therefore considerable time and questioning were needed to classify firms by our terms of reference,

determine their particular branch of activity, select those in manufacturing, and then from the monthly (or sometimes quarterly) entries add up to annual totals for each firm or entrepreneur, and then aggregate the annual by firm entries by branch of industry.

An interim step, prior to aggregation was to select from all entries those only which refer to long-term investments or loans and ignore the transfers arising from short-term liabilities or deposits. I note that no annual totals were available for most of the period, so that all the entries were given on a monthly basis, and only for very few intermittent years mainly around the end of the period the data was offered in a form of end of year totals. For the rest of the period annual totals were built up from monthly lists or quarterly reviews.

Another difficulty was that the individual entries on the original lists came in a great number of currencies, including $ USA, £ UK, French Franks, Swiss Franks, Belgian Franks, German Marks, Netherlands Guilders, Italian Lire, Swedish Krons, and Danish Krone. I therefore converted everything to $ USA values at the end-of-year rates given by the I.M.F. Financial Statistics Yearbooks, and then to Greek Drachmas at the current US Dollar/Drachma conversion rate.(1) The Drachma totals were then converted from current to constant 1958 prices.

A paramount difficulty in this research was the actual form of the original sources. As mentioned above the existing information has never been published. It has never been printed either. A few of the files were in mimeographed form. Many more in simple typewritten format with not always the top copy available. In some cases handwritten lists in ink or even in pencil were produced from private archives and folders of the Bank officials. The wealth of statistical information came in a varied form and was often difficult to decipher.

(1) International Monetary Fund : International Financial Statistics, Exchange Rates Ch., Washington D.C., various issues and dates.

TABLE XVI

Outflow of Funds on Long-Term Foreign Capital
(In Drachmas, at Current Prices)

	20-22 Food-Drink-Tobacco			23 Textiles		
	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow
1960	1 274 580	-	1 274 580	1 130 910	-	1 130 910
1961	1 807 890	-	1 807 890	1 614 540	900 000	2 514 540
1962	949 980	1 077 930	2 027 910	2 158 620	-	2 158 620
1963	998 880	779 430	1 778 310	1 120 140	-	1 120 140
1964	1 544 130	1 616 460	3 160 590	1 421 708	-	1 421 708
1965	1 896 660	1 669 470	3 566 130	6 125 607	4 254 999	10 380 606
1966	1 055 850	1 077 930	2 133 780	17 305 854	10 000 320	27 306 174

	24 Clothing-Footwear			25-26 Wood-Cork-Furniture		
	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow
1960	-	-	-	31 500	-	31 500
1961	255 000	-	255 000	21 000	-	21 000
1962	-	-	-	10 500	150 000	160 500
1963	200 550	334 260	534 810	-	-	-
1964	668 850	334 260	1 003 110	-	-	-
1965	498 840	4 558 059	5 056 899	-	-	-
1966	381 480	3 403 170	3 784 650	-	-	-

	27-28 Paper-Printing			29-32 Leather-Rubber-Plastics-Chemicals-Petrol		
	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow
1960	567 000	-	567 000	48 000	-	48 000
1961	1 655 751	-	1 655 751	564 030	-	564 030
1962	2 639 484	2 700 804	5 340 288	241 380	956 220	1 197 600
1963	224 190	-	224 190	1 843 314	1.055 853	2 899 167
1964	4 729 257	5 158 500	9 437 757	9 501 060	13 302 300	22 803 360
1965	830 034	3 938 778	4 768 812	35 346 180	6 174 450	41 520 630
1966	309 150	15 375	324 525	69 291 993	10 576 200	79 868 193

TABLE XVI
(Continued)

	33 Non-metallic Minerals			34 Basic Metal Industries		
	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow
1960	-	-	-	-	-	-
1961	-	-	-	-	-	-
1962	-	-	-	-	-	-
1963	-	-	-	-	-	-
1964	1 729 638	1 932 660	3 662 298	-	-	-
1965	185 820	-	185 820	6 750 000	2 861 070	9 611 070
1966	13 427 391	-	13 427 391	-	102 750	102 750

	35-37 Metal Prod. - Machinery - Electr. Equip.			38 Transport Equipment		
	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow
1960	1 935 669	-	1 935 669	-	-	-
1961	4 782 453	-	4 782 453	846 831	-	846 831
1962	6 529 398	305 970	6 835 368	2 487 450	-	2 487 450
1963	7 612 548	4 502 880	12 115 428	2 224 383	-	2 224 383
1964	4 882 710	7 655 490	12 538 200	-	7 647 300	7 647 300
1965	10 118 409	11 303 853	21 422 262	-	1 199 730	1 199 730
1966	6 948 957	9 806 349	16 755 306	2 500 584	12 589 671	15 090 255

	39 Miscellaneous Industries			20-39 Total Manufacturing Industry		
	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow	Profits + Interest	Capital Repatriation (Amortisation)	Total Outflow
1960	-	-	-	4 987 659		4 987 659
1961	-	-	-	11 547 495	900 000	12 447 495
1962	-	-	-	15 016 812	5 190 924	20 207 736
1963	-	-	-	14 224 005	6 672 423	20 896 428
1964	1 400 940	-	1 400 940	25 209 443	37 646 970	62 856 413
1965	-	-	-	61 751 550	31 402 350	93 153 900
1966	-	-	-	111 221 259	47 571 765	158 793 024

Sources : Estimates derived from unpublished Bank of Greece data.
For methods employed see text, p. 98 ff.

One unfortunate feature of the Bank information is that it does not make possible for the entire period the selection of of entries refering to long-term loans and investments alone. For the period prior to 1960 a total is given only for each firm which includes short-term liabilities and deposits as well as long-term obligations. For my purposes therefore in this thesis I will regretfully have to confine myself to information coverning the years 1960 to 1966 only. During this period more detailed Bank information on the breakdown of the outflow is available. It is interesting to note nevertheless, that practically no repatriation of long-term capital has taken place prior to 1960, and the interest outflows were also very small, a fact confirmed orally by the Bank officials. What I present consequently form undoubtedly the more important part of the time series on outflow of long-term funds (see Table XVI).

An examination of the backflows on long-term foreign investments shows that for most branches of the industry the image of a "young debtor" sector prevails. There are exceptions of course. The year 1961 in food-drink industries (20-22) was one of excess of outflow of funds over the inflow. Years 1961 and 1962 in textiles (23), 1962 in paper-printing (27-28), and 1962 in transport equipment (38), are other examples, rendering in fact the year 1962 the year of the heaviest relative burden for the industry as a whole. What is more important is that in no branch of the industry is there evidence of a rapidly increasing service burden under our definitions. The nearest to a consistent increase we observe in branches 23 (textiles) and 29-32 (chemicals etc.).

To look at those changes we obtain the sum of profits (interest) plus amortisation (repatriation of capital) from the entries of the previous Table XVI , converted from current to constant 1958 prices. This total outflow at constant prices is in Table XVII. In absolute amounts branch 29-32 (chemicals etc.) and the entire industry entries (20-39) give a picture of continuous expansion in the backflows. Another measure (Table XVIII) gives the outflow in relative rather

TABLE XVII

Total Outflow of Funds on Long-Term Foreign Investment
Including : Profits , Interest and Amortisation
In Drachmas , at Constant 1958 Prices .

	20-22 Food Drink Tobacco	23 Textiles	24 Clothing Footwear	25-26 Wood Cork Furniture	27-28 Paper Printing	29-32 Leather-Rubber Plastics Chemicals-Petrol
1960	1 099 552	975 611	-	27 174	489 138	41 408
1961	1 518 683	2 112 291	214 208	17 641	1 390 882	473 803
1962	1 516 039	1 613 756	-	235 490	3 992 330	895 310
1963	1 327 778	836 354	399 317	-	167 392	2 164 667
1964	2 285 663	1 028 145	725 425	-	7 150 588	16 490 842
1965	2 617 507	4 496 140	3 711 718	-	3 500 265	30 475 769
1966	1 523 342	12 354 945	2 701 926	-	231 684	57 019 267

	33 Non-metallic Minerals	34 Basic Metal Industries	35-37 Metal Products Machinery Electr. Equipm.	38 Transport Equipment	39 Miscellaneous Industries	20-39 Total Manufacturing Industry
1960	-	-	1 669 859	-	-	4 302 742
1961	-	-	4 017 408	711 364	-	10 456 280
1962	-	-	5 110 032	1 859 585	-	13 770 142
1963	-	-	9 046 002	1 660 839	-	15 602 349
1964	2 648 486	-	9 067 325	5 530 343	1 013 126	45 939 943
1965	136 390	7 054 439	15 723 748	880 591	-	68 596 567
1966	9 618 170	73 355	11 961 899	10 773 191	-	106 257 743

Note : Derived from Table XVI .
National Accounts deflators used for conversion in constant prices.

than in absolute terms: this is a measure of the ratio of outflow of funds against the inflow. I note that there have been years with outflow of funds, but no recorded inflow. In this case we are unable to obtain a "Domar" ratio, and substitute a star * instead (See Table XVIII).

It occured to this author nevertheless, that it would be a good idea to set the outflow entries against a certain measure not of foreign capital inflow for this year, but against some measure of cumulated inflow, some measure of "foreign-owned" capital stock. To build this up in a meaningful way, one has to look at the part of the stock that has changed control from the original foreign ownership to be taken over (by purchase, merger or other means) by Greek nationals. Original research in this direction has never been undertaken, so that again I had to rely on my own inquiries. There does not seem to have been any significant changes in ownership in the industrial "foreign" sector during this period, with the important qualification that in our definitions expatriate Greek capital continues to be classified as foreign capital.

The method of calcultating the foreign capital stock is the same as the method I employ in a later chapter to derive a capital stock estimate for the entire economy. The methods and definitions are described in detail there. As it was thought desirable to set the outflow against foreign-owned stock "net" of repatriated backflows, a net capital stock measure was developed, being conceptually and in calculation more appropriate for meaningful comparisons. The calculation of the stock net of depreciation was made under a fairly general set of assumptions concerning the composition of the stock. Foreign factories were assumed to have the same percentage distribution of investment layouts in terms of land and buildings, equipment, and production machinery, as the entire industry comprising of both foreign and Greek concerns. This distribution was accepted as a mater of expediency, as no

TABLE XVIII

Backflow of Funds on Foreign Capital Relative to Annual Foreign Investment, the "Foreign-Owned" Capital Stock and the Proportion of Profits for the Industry as a Whole on the Net Capital Stock

	20-22 Food-Drink-Tobacco			23 Textiles		
	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of Net Capital Stock (Greek+Foreign Sectors)	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of of Net Capital Stock (Greek+Foreign-Owned Sectors)
1960	0.142935	0.033967	0.1627	*[1]	0.824692	0.1936
1961	1.005221	0.046819	0.1355	*[1]	1.892734	0.1975
1962	0.070407	0.028863	0.0980	*[1]	1.531078	0.2640
1963	0.044898	0.016643	0.0840	0.024560	0.023862	0.2236
1964	0.161934	0.025312	0.0747	0.012203	0.007766	0.1716
1965	0.106742	0.023641	0.1197	0.218394	0.034307	0.1898
1966	0.078516	0.012169	0.1431	0.873239	0.089300	0.2375

	24 Clothing-Footwear			25-26 Wood-Cork-Furniture		
	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of Net Capital Stock (Greek+Foreign-Owned Sectors)	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of Net Capital Stock (Greek+Foreign-Owned Sectors)
1960	-	-	0.0487	0.004118	0.000620	0.8652
1961	*[1]	0.042159	*[3]	*[1]	0.000468	0.7357
1962	-	-	0.4893	0.206860	0.006421	0.3646
1963	0.103343	0.014080	0.6465	-	-	0.1626
1964	0.034922	0.015305	0.4822	-	-	0.1275
1965	0.814315	0.075464	0.3581	-	-	0.1343
1966	0.237581	0.046835	0.5995	-	-	0.0725

	27-28 Paper-Printing			29-32 Leather-Rubber-Plastics-Chemicals-Petrol		
	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of Net Capital Stock (Greek+Foreign-Owned Sectors)	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of Net Capital Stock (Greek+Foreign-Owned Sectors)
1960	0.017923	0.004967	0.2417	0.000433	0.000239	0.1692
1961	0.052339	0.011636	0.1682	0.005390	0.001889	0.1283
1962	1.772363	0.034722	0.0848	0.013957	0.002973	0.1196
1963	0.091919	0.001517	0.1266	0.007711	0.003828	0.0980
1964	0.156949	0.047611	0.0755	0.092367	0.023128	0.0879
1965	0.192263	0.021956	0.0846	0.018667	0.013207	0.0381
1966	0.051011	0.001494	0.0807	0.179317	0.022837	0.0493

TABLE XVIII
(Continued)

33
Non-metallic Minerals

	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of Net Capital Stock (Greek+Foreign Sectors)
1960	-	-	0.1249
1961	-	-	0.1139
1962	-	-	0.1177
1963	-	-	0.1009
1964	0.086332	0.035090	0.0998
1965	0.004976	0.001381	0.1095
1966	0.048448	0.032972	0.1224

34
Basic Metal Industries

	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of Net Capital Stock (Greek+Foreign Sectors)
1960	-	-	*2
1961	-	-	*2
1962	-	-	0.0357
1963	-	-	0.0537
1964	.-	-	0.0295
1965	0.006482	0.006053	0.0147
1966	0.000001	0.000043	0.0115

35-37
Metal Prod.-Machin.-Electr.Equipment

	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of Net Capital Stock (Greek+Foreign Sectors)
1960	0.089086	0.020691	0.1614
1961	0.080388	0.034580	0.1480
1962	0.753087	0.043658	0.1431
1963	0.568338	0.071286	0.3237
1964	0.441341	0.064334	0.2975
1965	0.333128	0.086935	0.2608
1966	0.348408	0.058097	0.2565

38
Transport Equipment

	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of Net Capital Stock (Greek+Foreign Sectors)
1960	-	-	*2
1961	0.961598	0.001423	*2
1962	1.471298	0.003864	0.1847
1963	0.024089	0.003126	0.1996
1964	0.044299	0.008697	0.1761
1965	0.026345	0.001338	0.1921
1966	*1	0.017040	0.2065

39
Miscellaneous Industries

	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of Net Capital Stock (Greek+Foreign Sectors)
1960	-	-	*2
1961	-	-	*2
1962	-	-	0.2682
1963	-	-	0.5060
1964	0.768573	0.118356	0.3289
1965	-	-	0.2959
1966	-	-	0.2000

Note : *1 = There is an outflow but no inflow recorded. *2 = No data on profits available.
*3 = Profits estimate adjusted (see Table p. 118). Entry omitted in this context.

TABLE XVIII
(Continued)

33
Non-metallic Minerals

	Outflow/ Foreign Investment	Outflow/ Net Foreign Capital Stock	Profits as Proportion of Net Capital Stock (Greek+Foreign Sectors)
1960	-	-	0.1249
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Note : *1 = There is an outflow but no inflow recorded. *2 = No data on profits available.
*3 = Profits estimate adjusted (see Table p. 138). Entry omitted in this context.

other evidence concerning the composition of foreign investments was reliable enough or general enough to be accepted instead. The depreciation rates for each general category of assets are again the ones supplied by the National Accounts, as employed in our calculation of capital stock in Chapter Nine, Para. C, where the reader is refered for a description of the approach and the problems involved.

The above results I have used to obtain an outflow/stock-of-foreign-capital ratio. This ratio is useful because it gives us some measure of the outflow of funds against a steadier, less fluctuating indicator than the annual foreign investment inflow. If also gives a ratio for the years where no foreign investment inflow took place. I present both the "Domar"-type ratio and the outflow-of-funds/stock-of-foreign-capital ratio for comparison.

One has to comment on the early returns in branches 20-22 (food-drink industries), 23 (textiles), and in particular 35-37 (metal products, machinery, electrical equipment) and 38 (transport equipment). Those were high in the first half of the period and declined subsequently. This relative decline in the ratio reflects the healthier structure in later years with the outflow returning to more normal levels. In the case of branch 35-37 a large part of the outflow can be attributed to interest at a very high level paid abroad by one firm alone.

Another interesting observation relates the profit + interest component of the outflow to the profit rate of the entire branch of the industry including Greek and foreign firms as well. For a measure of profits in the entire industry I present estimates of net profit rates (net = after allowing for depreciation) derived from a sample of industries in the annual survey of the Federation of Greek Industries.(1) The method of estimate of profit rates and complete results are given and described in Chapter Nine Ea. In the context of exports of foreign firm gains it is interesting to set the Federation-derived rates by branch of the industry

(1) Profits net of depreciation (but gross of taxes etc.) over net capital stock are used.

against the profit + interest component of the outflow. On further reflection this latter component was not thought to be at all times an accurate indicator of foreign firm profitability for two reasons. First that it does not reveal the level of retained profits, which in the first years of operation of a firm are generally quite high. And second that in some high-profit years foreign firms may channel abroad some of their profits under the guise of capital repatriation. This may particularly be so on the occasion where the national profits dropped but foreign profits remained high.

To establish some discernible pattern one should look at the profits + interest entries of foreign firms (the first column in Table XVI), at the total outflow over total net foreign capital stock entries (the second column in Table XVIII), and the net profit rates for the entire branch in each case (given in Table XVIII).

It is interesting to note that the slump in profits at the national level in branch 20-22 in the years 1962 and 1963 is reflected in the foreign sector profits, although the foreign sector makes a quicker recovery in 1964. There is also a reflection in textiles (23) of the increased foreign profits in 1962 at the national level, followed by a sudden decrease in the profits in the foreign sector in 1963, which was compounded by the considerable increase in new investments. This has caused the ratio in the second column on Table XVIII to drop very steeply. Increased capital repatriation in 1965 in branch 24 (clothing-footwear) disguises a fall in profits parallel if not of the same magnitude as the national one so that the outflow/net-foreign-capital-stock ratio for 1965 in Table XVIII actually records an increase rather than a drop. The foreign recovery in profits in 1966 was slower than the one on the national level.

Wood-cork-furniture industries in the foreign-owned sector had very small profits to export compared with the entire industry, and stoped exporting even at that very low level after 1963. A policy of reinvested earnings could possibly have disguised the true potential of the foreign-owned sector, although significantly at the national level as well profits consistently decreased through-

out the period. (See profit entries on Table XVIII). The same decrease in profits at the national level is evident over the period in branch 29-32 (chemicals etc.) at a more or less consistent rate. On the contrary the level of foreign profits was rising from an initial very low level, far below the national average, and was gradually catching up as time went on. Non-metallic minerals (33) has the most consistent level of profits of all industries at the national level. With three observations only for foreign profits exported it would be a bit risky to try to discern a pattern, even with such wide fluctuations in the foreign sector rates. In branch 34 (basic metal industries) the evidence of outflow of foreign profits suggests that for the foreign sector profits were the lowest in the industry, just as at the national level. Evidently the giant aluminium concern of Pechiney Co. still had undercapacity problems to sort out before it operated economically, and was reinvesting most of the little profits it had. Metal products and machinery are an example of a branch with increasing profit rates over the period for the entire industry. The foreign sector, although enjoying profits higher than other foreign sectors is not at the profit level of the entire industry, although increasing at the same high rate with the exception of the year 1966. The last three years show higher amortisation than interest returns. In branch 38 (transport equipment) the interest and profit rate fluctuate very widely, with no exported profits in the years 1964 and 1965. This is in variance with the evidence for the entire industry where consistently high profits are recorded. Obviously no profits were distributed on foreign capital for those years, and with retained profits reinvested the firms only repatriated some of their capital at a rather low level. In view of the special circumstances of this branch with expatriate Greek ownership of the overwhelmingly largest investment (Niarchos) it is possible that a higher than normal percent of profits was retained in Greece than would be the case with a foreign investor proper. In this case therefore it is likely that the exported foreign firm profits diverge more

significantly from the true total level of foreign profits than in any other branch.

Overall there seems to be a certain pattern discernible in some cases, where in high-profit years for the foreign sector, some of the profits are channeled abroad under the guise of capital repatriation (amortisation) if the industry at the national level happened in this particular year to have a drop in profits, as if the foreign entrepreneurs actually wanted to disguise their profits in those lean years. One can clearly see this looking at the capital repatriation entries (amortisation column) on Table XVI and compare them with the profit rates for the entire industry on Table XVIII. One could see this sudden increase in amortisation transfers in the year 1962 onwards in branch 20-22 with a simultaneous drop in the profits at the national level. In branch 24 in the year 1965. Questionably in branch 25-26 in year 1962. Certainly in branch 27-28 in the years 1962 and 1964. Questionably in branch 29-32 from the year 1963 onwards. In branch 33 in the year 1964. In branch 34, years 1965 and 1966. In branch 38 in the year 1964. When in the total industry rates a drop is observed in profits, almost certainly a parallel increase is observed in foreign amortisation transfers, more often than not accompanied by some simultaneous decrease in the profit transfers.

One should of course treat the statistical evidence with care. It is obvious that definitional in-built features of the two measures of profits and their weighing over a net capital stock figure would lead us to expect in the first instance generally higher profit rates in the case of total industry entries with their stock in a higher state of depreciation.(1) In the case of modern new foreign industries one could expect their net stock to be very much nearer their undepreciated gross stock, with resulting lower profit rates in measurement. One should be careful not to compare the two rates in absolute terms, to decide on the compa-

(1) By "profit rates" in this context we mean the net-profits/net-capital-stock ratios, with profits before taxes and the capital stock after depreciation.

rative profitability of the foreign and the local sectors. The existence of retained profits or profits not exported from the country would anyway preclude this kind of comparisons. It is not the level of but the relative changes in the rates of profitability which are important and we are discussing here. Some underlying trends can of course be seen in the two measures, and it is very satisfying that two measures derived from so very diverse sources and with so very dissimilar methods have so many complementary features and are the basis of meaningful comparisons.

CHAPTER SIX

Direct Effects of Foreign Investment : Export-Creation and Import-Substitution

A. Issues Involving Import Substitution

The feasibility and desirability of export-led growth to provide the initial impetus for the development of an economy has often been questioned in practice. The availability of market opportunities outside the economy and the capacity of the export sector to exploit any such opportunities often condition the externally-oriented stage of growth. A different process of internally-oriented growth occurs where production for the internal market becomes the major objective in growth.(1) The distinction between inward-looking and outward-looking industrialisation as alternative development paths in transforming an economic structure stems from distinctive features in developing economies as well as their respective export markets.

The Greek experience as we have already described in Chapter Three (p. 25 ff.), and the bias towards industrialisation and diversification of the economy points to the emergence of the industrial sector as the one with the highest marginal growth contribution of investment. The desirability of this bias towards industrialisation is backed by an internationally observed deterioration of the terms of trade of primary producers, given the difference in income elasticity of demand between manufactured and primary commodities.

Industrialisation nevertheless, is often inhibited to some extent by a number of factors. I have mentioned the importance of savings both Greek (see p. 37 ff. above) and foreign (p. 60 ff.)

(1) M. Mamalakis : "The Export Sector, Stages of Economic Development, and the Saving-Investment Process in Latin America", Economia Internazionale, 23, 1970, p. 283 ff.

in mobilising the huge amounts of capital that the industrialisation programme requires, as well as the limitations on industrialisation imposed by material capital in the form of foreign exchange to finance capital goods imports. Import substitution under those constraints would only be a practical proposition if sufficient capital including both Greek and foreign funds could be invested in import-competitive industries, or if a programme to relieve the shortage of foreign capital were introduced with a possible restriction of non-input imports to encourage their production in Greece.

I have also stressed the lack of inducement to invest (pp.26 ff.,45-6 and 80 ff. above) generally attributed to the small size of a market of low-level purchasing power, and the strategy of balanced growth sometimes advocated as a remedy to widen the market (pp.30-1). This policy would undoubtedly involve the replacement of imports by all-round but horizontal Greek production accentuating perhaps in the initial stages the consumer good industries.

The ability to invest and exploit opportunities for productive investment was seen as another crucial factor in industrialisation, and the role of incentives and pressures due to inbalances in an economy formulating alternative policies of unbalanced growth (pp. 32-3) seems to favour those sectors where large forward and backward linkage effects provide a promising basis for development. Vertical selective import-substitution measures would then be directed at import replacement at the final production stage and with backward-linkage effects operating, the prerequisite intermediate and basic stages would be stimulated.(1)

Whether one should view import substitution as a deliberate policy to accentuate growth or a natural process resulting from economic growth is determined by the question of whether imports are related to the rate of economic growth. As this relationship can not be directly observed the inevitability of import substitution can be indirectly linked to growth elasticities derived

(1) N.H. Leff and A. Delfim Netto: "Import Substitution, Foreign Investment and International Disequilibrium in Brazil", Journal of Development Studies. April 1966, 3, p. 218 ff.

as functions of per capita income. The Greek experience confirms that the import requirements during the period of expansion outpaced the export growth and this might encourage a natural evolution of import replacement to redress the imbalance.

A deliberate government policy in favour of import substitution would exploit existing patterns of demand for quicker returns in the place of an effort to win foreign markets. Also it would save foreign exchange by substituting imports of raw materials for final uses and at the same time augment domestic value added. But this normally would involve a high cost of production which could only survive under a high tariff wall, preventing the assimilation of new technologies in improving production quality, and increasing productivity by reducing production costs.(1) We should also note that the production of domestic import substitutes could be expected to move into the export sector only after a very considerable time lag. Therefore once the competitive imports for one sector were finally replaced by import substitutes, the argument went, the pure replacement demand could decline and the growth of those substitutes could suddenly fall.(2)

Export-led growth on the other hand as opposed to import substitution is effective if the multiplier effects due to the rise in domestic incomes are internalised and if the Greek demand for consumption goods (in general but particularly of imported ones) is not income elastic.(3) The available evidence of research covering the period 1955-1964 for the Greek income elasticity of demand for imports shows that the elasticity was quite high for manufactured

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(1) Atsushi Murakami : "Two Aspects of the Export of Manufactured Goods from Developing Countries", Developing Economies, 6, 1968, p.264. UNCTAD : Towards a New Trade Policy for Development: Report of the Secretary-General Raul Prebisch, United Nations, New York, 1964.

(2) David B. Humphrey : "The Determinants and Structure of Import-Substitution", Western Economic Journal, 8, 1970, p. 248.

(3) Cf. P.B. Clark : Planning Import Substitution, North-Holland Publishing Co., Amsterdam-London, 1970, p. 18.

goods, but unfortunately the available evidence does not distinguish between consumer good industries and capital good industries.(1)

INCOME ELASTICITY OF DEMAND FOR IMPORTS : 1955 - 1964

Food and Live Animals	0.42
Crude Materials Inedible	0.53
Manufactured Goods (classified by material)	0.65
Mineral Fuels, Lubricants, etc.	1.09
Chemical	1.30
Machinery and Transport Equipment	2.58
Total Imports	0.96

Source : See footnote (1) below.

With a high elasticity of demand for consumer imports, the external stimulus of export-led growth could have been dissipated with foreign exchange diverted to direct consumer demand rather than capital goods imports for a possible import-substitution scheme, had there actually been one planned for the Greek economy. In fact things developed in a much more haphazard and unplanned manner in Greece. And besides, the true criterion is not the absolute level of income elasticity of demand for imports as such, but whether the demand for imports rises faster than the capacity of the country to import. This latter was conditioned by the country's inability to reallocate factors of production so that new forms of production would meet the new internal and external demand requirements. An inelastic domestic supply inhibited the channeling of potential savings into investment unless complementary imported goods were increasingly brought in.(2)

The quantitative measurement of import substitution depends on the availability of data, and on the definition of import substitution, which could take a number of plausible forms. The simplest definition is "the domestic production of what would

(1) T. Hitiris : "The Greek Demand for Imports of Goods, 1955-64", Journal of Economic Studies, (3-4), December 1968, p. 63 ff.

(2) H.B. Chenery and A.M. Strout : "Foreign Assistance and Economic Development", A.E.R., 56, September 1966, p. 682 ff.

otherwise have been imported". What would have been imported is also difficult to identify, but I shall accept import substitution with reference to the change in the proportion of imports to total supply. In other words the ratio of imported manufactures to total domestic absorption of manufactures.(1) With Greek production rising at a quicker rate than imports, import substitution is taking place. The growth of output is generated by growth in demand with constant ratio of foreign to total supply. Any change in the supply ratio is defined as import substitution accounting for the residual change in output.

It is my intention in this chapter to investigate whether foreign investment has been attracted in certain sectors of the manufacturing industry for which we have evidence of import substitution (or export creation), and see whether we could attribute some of this import substitution to the existence or the increase in foreign capital inflow.

(1) Hollis B. Chenery: "Patterns of Industrial Growth", A.E.R., September 1960, 50, p. 640.
G.C. Winston: "Notes on the Concept of Import Substitution", Pakistan Development Review, Spring 1967, 7, p. 107 ff.

B. Sources, Data and Methods

In the context of this analysis I define:

P = Gross Production Value at current prices. Derivation of G.P.V. for the year 1958 given in Table XX.

M = imports of manufactured products directly from abroad, from bonded warehouses or free zones, for merchanting, production, or final consumption, excluding goods imported for "free use" and intended to be reexported, given in drachmas calculated on the base of the current official conversion rates, at C.I.F. values.

X = exports of products manufactured in the country or nationalised, excluding goods re-exported from "free use" or goods exported and intended for re-import, in drachmas calculated on the base of the current official conversion rates, at F.O.B. values.

A = total domestic absorption of manufactured goods.

We therefore have that $A = P + M - X$.(1) In a number of studies total demand (absorption) is broken down into final domestic demand plus intermediate demand.(2) This has obvious analytical advantages, but unfortunately it is impossible in our case to follow this breakdown since no measure of intermediate demand is given in any statistical source in Greece at the branch of the manufacturing industry level. Our level of aggregation is dictated by the presentation of value added in the National Accounts, where manufacturing industry is broken down in eleven groups.

Imports and exports present a major problem in estimation. The existing import and export statistics by commodity issued by the National Statistical Service are given at a very detailed disag-

(1) Hollis B. Chenery : On.cit., 1960, p. 624 ff.

(2) S.R. Lewis and R. Soligo : "Growth and Structural Change in Pakistan Manufacturing Industry, 1954-1964", Pakistan Development Review, 5, 1965, p. 103.
M.L. Eysenbach : "A Note on Growth and Structural Change in Pakistan's Manufacturing Industry, 1954-1964", Ibid, 9, 1969, p. 59.
Padma Desai : "Growth and Structural Change in the Indian Manufacturing Sector, 1951-63", Indian Economic Journal, Oct.-Dec. 1969, p. 208

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gregated level by tariff class numbers at the six digit disaggregation level. Statistic listing numbers are also provided for the same level of disaggregation, as well as a breakdown of commodities by country of origin or destination, with both quantities and values in drachmas given. Unfortunately aggregations by category according to Greek Customs Tariff breakdown not only include raw materials and products which are not in the "manufactured products" category, but also offer a breakdown which does not correspond to that of the National Accounts.(1)

In a very extensive statistical undertaking I have selected from the individual disaggregated entries of the Foreign Trade Yearbooks of the Statistical Service the relevant entries of manufactured commodities.(2) Those I have grouped together in the eleven categories of the National Accounts for the manufacturing sector, and adding up individual entries I obtained an import and export breakdown at a suitable level of aggregation. The main difficulty was in determining the allocation of individual entries to the groups of industrial production employed by the National Accounts methodology. I used much published material of the National Statistical Service to help clarify ill defined entries, and I used my judgement for the allocation of such entries whose industrial origin was ambiguous. A further difficulty was that the classification system changed in the year 1960, so that the old Foreign Trade Yearbook entries do not correspond to the new ones because of different tariff groupings. The classification had therefore to be done twice, the second time for the period in the sixties, using this time alternative definitions. The entire approach was dictated by the need of consistency not only

(1) National Statistical Service of Greece : Foreign Trade of Greece, Athens, various dates and issues.
National Statistical Service of Greece : National Accounts of Greece. 1948-1970, Athens, 1972.
(2) See Appendix in the end of this chapter.

TABLE XIX

Imports and Exports : Results of Classification by Producing Sector of the Manufacturing Industry.

(In Drachmas, at Current Prices)

	IMPORTS		EXPORTS	
	1958	1966	1958	1966
20-22 Food-Drink-Tobacco	1 273 532 371	1 576 819 617	825 013 021	777 232 797
23 Textiles	1 605 748 302	2 315 803 789	873 620 384	1 282 230 719
24 Clothing-Footwear	30 639 041	71 764 547	13 911 811	107 920 854
25-26 Wood-Cork-Furniture	542 564 168	1 295 808 060	3 800 827	29 848 737
27-28 Paper-Printing	509 812 888	1 051 400 971	21 623 998	69 643 000
29-32 Leather-Rubber-Plastics Chemicals-Petrol	3 770 402 283	5 501 715 291	211 030 108	695 929 161
33 Non-metallic Minerals	213 503 371	545 644 262	80 650 458	405 125 923
34 Basic Metal Industries	934 795 351	2 075 679 800	36 789 446	488 230 291
35-37 Metal Products-Machinery Electrical Equipment	3 258 620 009	7 721 115 827	35 179 912	328 105 282
38 Transport Equipment	2 445 229 355	6 984 549 584	4 035 945	70 623 419
39 Miscellaneous Industries	220 943 191	791 423 374	5 299 711	41 586 911

Sources : See Appendix I at the end of this chapter.
Derived from raw disaggregated data by commodity and country in National Statistical Service : Foreign Trade of Greece, 1958, 1966 Issues, Athens.

with respect to the National Accounts industrial breakdown by sectors, but also by the need of consistency relative to the breakdown (under different definitions) of the entries for the two periods covered by our data. Dissaggregated individual entries were therefore classified by sector and were then added up to give sectoral totals. A list of all classification code numbers for imports and exports pooled together by sectors of the manufacturing industry is given in the Appendix at the end of this chapter. I present there counts of imports and exports taken for the years 1958 and 1966. Counts for imports and exports have been made for some preceeding years in the beginning of the period, but I am not going to use them because of the difficulty of calculating Gross Production Value prior to 1958 when the first industrial survey made this possible. The results of this classification of imports and exports by producing sector of the manufacturing industry for the years 1958 and 1966 are given in Table XIX.

For a better examination of the change in the export potential I further present in Table XXXVIII exports for the years 1953, 1954, 1959, 1960, 1965, 1966, in drachmas. Those estimates can be viewed as a proportion of total value added by sector. From an examination of the findings it becomes obvious that exports could not be considered a "leading sector" to provide a dynamic stimulus for the expansion of the economy. They have nearly throughout the period and the range of industries been a "lagging" sector and nearly everywhere the demand for imports by far outstripped the capacity to import. Imports for the same period are given for comparison in Table XXXVIII. Invisibles and foreign loans obviously had to cover the deficit at an increasing rate. This was a typical case of "export-lagging" type of development. The industry did not have the flexibility in economic organisation to avoid the sluggish growth of exports, with the exception of basic metal industries (34), chemicals (29-32), and to a lesser degree metal and electrical products (35-37). (See Tables XIX and XXXVIII).

In some branches the volume of exports, taking account of all price increases, was certainly falling short of the rise in the world trade volume of commodities. Food industries (20-22) and wood and furniture products (25-26) are two examples. The growth in world trade in petroleum (refined) was also not followed by the Greek refining units, although a much more vigorous expansion could be expected in this field in the years after the end of our period.

Any significant increase in exports came not so much in the food-drink-tobacco which actually show a relative decline , or textiles and non-metallic minerals (glass, clay, pottery, cement etc.) with their traditional handicraft and specific material-dependent early-established labour-intensive manufactures, but in the range of newly emerging industries of light manufactures, and to a lesser degree in some intermediary industries and transport equipment.(1) This pattern seems to contradict Linder's theories of "overlapping demands",(2) according to which because of dissimilar demand structures owing to differences in per capita incomes, there is no overlapping demand in developing countries like Greece and the advanced export markets in Europe. Commodities enjoying "representative demand" and competitive advantages in production in Greece would not be absorbed in European markets, according to Linder. The more or less uniform improvement of export performance in Greece over the period (uniform not in the sense of blanket increases in all industries -which is not the case- but in the sense of increases in diverse products and not in products of one specific structure of production), contradicts this theory. It is most likely a result not of the fact that the Greek domestic market by the end of the period was approaching the lower limits of the European structure so as to

(1) Increases in exports of manufactures etc. in the 1950-3/1960-3 period were very high compared with most developing countries. See Barend A. DeVries: The Export Experience of Developing Countries, World Bank Occasional Paper No.3, J.Hopkins,1967,p.25.

(1) S.B. Linder : Trade and Trade Policy for Development, Praeger, New York, 1967, Ch.II.

offer a basis of export potentiality, but rather of the fact that in a number of cases domestic demand was not a precondition for exports, particularly in the case of giant foreign investors catering for an international clientelle, such as the foreign financed aluminium Pechiney Co., and to a lesser extent the petrol refineries of ESSO, the Hellenic Shipyards, and a number of specialised and standardised-product companies in chemicals, rubber, metal products and electrical equipment. And although three quarters of the Greek exports went to European countries there was always an export market in the developing countries where Greek products could compete with similar ones from western European countries with the help of various pricing policy instruments.(1)

The impressive rise in branch 34 (basic metal industries) renders this the foremost exporting sector of the industry, and has much to do with the expansion in foreign-financed aluminium industry as described. The total manufacturing industry share doubled in thirteen years. This looks quite an impressive performance, but then the expansion started from very low levels. Actually the 1953 pre-devaluation level was substantially lower to that of 1954.

The trends in the import content of supplies nevertheless presents a far worse picture. Greece in 1966 was heavily dependent on imports for the supply of manufactures. I was unable to obtain estimates of what was the finished-product-content and what the intermediate-product-content of imports, but the picture in overall imports is most discouraging. Of course one accepts that the rate of decline in the import content of consumption depends on a great number of factors some external to the Greek economy and some internal. The stage of industrial development may be important, and indeed since 1950 the import content has been rising in the industrial countries.(2) With Greece attaining rapid indu-

(1) H.B. Lary : Import of Manufactures from Less Developed Countries, National Bureau of Economic Research, New York, 1968.
(2) Alfred Maizels : Industrial Growth and World Trade, Cambridge University Press, 1963, p. 139.

strialisation at a more mature level at the end of the period similar effects might have been in action.

Looking at Table XXXVIII, despite the difficulties in classification due to the change in the system, the estimates for 1959 and 1960 seem reasonable and the jump in imports in branch 38 (transport equipment) from 3,956 m. drachmas in 1959 to 6,852 m. drachmas in 1960 is not a statistical artifact but a real change, due mainly to the sudden increase in purchases of ships, new and more than 300 tons, from 1,930 m. drachmas in 1959 to 5,457 m. drachmas in 1960 due to increases in international freights and improved shipping prospects.

The best way to look at those changes is to derive the $P + M - X$ totals (in other words the domestic absorption estimates), which I present in Table XXI, and then derive the $\frac{M}{P + M - X}$ ratio for each year. Defining the ratio with year subscripts as m_{1958}, m_{1966} for the relevant dates of my calculations, I present the ratios in Table XXI. The choice of those two dates for the import substitution test was dictated by the availability of data for an estimate of Gross Production Value P (see Table XX).

If we follow Chenery[1] and Maizels[2] the import substitution figure is the reduction in imports of manufactured goods in one period relative to what they would have been at that date had the rate of the previous period still prevailed, or in other words had the imports grown proportionally to the growth in domestic absorption A. The relevant ratios obtained therefore are the difference of two m values over two successive periods of time. Those are given in Table XXI.

What the $m_{1966} - m_{1958}$ estimates give us is a <u>rate</u> of gross import substitution and not an estimate of gross import substitution proper.[3] They are an estimate of the change in import ratios,

(1) Hollis B. Chenery : <u>Op.cit.</u>, Sept. 1960, p. 624-54.
(2) Alfred Maizels : <u>Op.cit.</u>, 1963, PP. 150-52.
(3) The latter estimate is given in drachmas in the last column on Table XXI and its derivation is reported on p. 118 below.

TABLE XX

Derivation of 1958 Gross Production Value
(In million drachmas, at current prices)

	1958 Total Value Added (1)	O_{10} Value Added (2)	U_{10} Value Added (3)	1963 U_{10} Value Added as Proportion of 1963 U_{10} Gross Production Value (4)
20-22	3 453	2 481	972	0.2505
23	2 425	1 838	587	0.2892
24	2 213	312	1 901	0.4949
25-26	806	269	537	0.4006
27-28	559	513	46	0.4070
29-32	923	1 226	* (7)	* (7)
33	860	606	254	0.4625
34	196	258	* (8)	* (8)
35-37	1 652	742	910	0.4300
38	318	285	33	0.6190
39	333	107	226	0.5732

	1958 U_{10} Gross Production Value (5)	1958 O_{10} Gross Production Value (6)	1958 U_{10} + O_{10} Gross Production Value
20-22	3 880	10 497	14 377
23	2 030	5 121	7 151
24	3 840	878	4 718
25-26	1 340	674	2 014
27-28	113	1 330	1 443
29-32	*	3 680	3 680
33	549	1 154	1 703
34	*	836	836
35-37	2 116	1 703	3 819
38	53	560	613
39	394	254	648

Sources & Notes : (1) National Statistical Service: National Accounts of Greece, 1948-1970, X:2,N.A., Athens, 1972, p. 55. (2) National Statistical Service: Results of the 1958 Annual Industrial Survey, Publ. L:3, Industry, Athens, 1961, p. 15. (3) Derived as residual. (4) National Statistical Service: Annual Industrial Survey for the Year 1963, L:26, Industry, pp. 96-7. Shares computed from information therein, and applied on (3) O_{10} to give (5). (6) Op.cit., above (2), p. 16. (7) 1958 Industrial Survey O_{10} value added estimate exceeding N.A. U_{10} + U_{10} total value added, due to alternative definitions in the branch. U_{10} value added assumed equal to zero. (8) Survey O_{10} value added exceeding the N.A. estimate. U_{10} value added known to be near zero level.

O_{10} denotes large scale industries with more than 10 employees and U_{10} small scale ones with less than 10 such (definition by the National Statistical Service).

TABLE XXI

Estimation of Import Substitution

	Domestic Absorption : A = P + M - X		Proportion of Imports in Absorption : m = M / A	
	1958	1966	1958	1966
20-22	14 825 519 350	28 021 782 820	0.085901	0.05671
23	7 883 127 918	12 408 128 070	0.200400	0.186630
24	4 734 727 230	4 690 541 693	0.006471	0.015300
25-26	2 552 763 341	5 219 140 263	0.212539	0.248279
27-28	1 931 188 890	4 825 191 810	0.263989	0.217898
29-32	7 239 372 175	14 578 087 130	0.520818	0.377390
33	1 835 852 913	4 663 683 339	0.116296	0.116998
34	1 734 005 906	4 077 618 509	0.539095	0.509042
35-37	7 042 440 097	17 337 837 545	0.462711	0.445330
38	3 054 193 410	9 329 079 165	0.800613	0.748685
39	863 643 480	1 398 042 463	0.255827	0.570172

	Change in Import Ratio : $m_{1966} - m_{1958}$	Gross Import Substitution : $G.I.S. = A_{1966}(m_{1966} - m_{1958})$	
20-22	- 0.029630	830 285 425	(Food-Drink-Tobacco)
23	- 0.013770	208 853 611	(Textiles)
24	0.008829	-	(Clothing-Footwear)
25-26	0.035740	-	(Wood-Cork-Furniture)
27-28	- 0.046091	222 397 915	(Paper-Printing)
29-32	- 0.143428	2 090 935 037	(Leather-Rubber-Plastics-Chemicals-Petrol)
33	0.000702	-	(Non-metallic Minerals)
34	- 0.030053	122 544 669	(Basic Metal Industries)
35-37	- 0.017381	301 349 580	(Metal Products - Machinery - Electr.Equipment)
38	- 0.051928	484 440 422	(Transport Equipment)
39	0.314345	-	(Miscellaneous Industries)

Notes : All entries in drachmas are at current prices, computed from estimates in the previous two Tables.

Negative entries in the $m_{1966} - m_{1958}$ estimates indicate the existence of import substitution.

Use of import estimates including cost margins (trade, freight and other charges) does not upset the consistency of the estimates as such costs in our rather short-term estimates are assumed a constant proportion of the value of imports and could only change in the long-run following changes in the terms of trade (for ad-valorem charges) on one hand, or in material-handling and transport technologies.

and negative ratios indicate the years in which import substitution had taken place. We observe that some degree of import substitution has occured in most industries with the exception of clothing-footwear (24) and wood-furniture industries (25-26), the rather less important of the consumer industries, non-metallic minerals (33) and miscellaneous industries (39), the rather less important of the "capital goods" industries. In those four industries import substitution was negative (positive ratios) to the extent of three and a half per cent additional absorption in 25-26 and thirty one per cent additional absorption in 39. Absence of import substitution in branch 33 (non-metallic minerals) is a little bit more worrying because it is coupled with an observed suspension later in the period of a remarkable early export drive.

It is easy to see that by far the most significant import-substituting sector have been chemicals and allied products (leather, plastics, rubber, petrol) branches 29-32, with a high fourteen per cent change in the import ratios between the years 1958 and 1966. Smaller changes of about five per cent occur in transport equipment (38) and paper industries (27-28), with basic metal industries (34) and food-drink-tobacco (20-22) following, with about three per cent each. Metal products and electrical equipment (35-37) and textiles only show a change of between one and two per cent.

We may now obtain import substitution estimates in drachmas, following Maizels and McKinnon[1] as indicated below. We first define G.I.S. as gross import substitution and then set

$$G.I.S. = A_{1966}(m_{1966} - m_{1958}) .$$

Relevant entries and results are given in Table XXI .

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(1) Ronald I. McKinnon : "Foreign Exchange Constraints in Economic Development and Efficient Aid Allocation", Economic Journal, June, 1964. Ronald I. McKinnon : "Maizels on Industrial Growth and World Trade : Implications for Economic Development", Economic Development and Cultural Change, 14, No.1, October 1965, pp. 94-106.

TABLE XXII

A Proportional Weighted Measure of Import Substitution and an Estimate of Net Import Substitution.

	Hypothetical Import Level in 1966 Had Imports Grown in Proportion to A: $m_{1958}(A_{1966})$	G.I.S. / $m_{1958}(A_{1966})$: No-Substitution (Zero) to Complete-Substitution (One)
20-22	2 407 099 166	0.344931
23	2 524 557 737	0.069700
24	30 352 495	-
25-26	1 109 270 852	-
27-28	1 273 797 560	0.174594
29-32	7 592 559 339	0.275392
33	542 367 717	-
34	2 198 223 750	0.055747
35-37	8 022 407 468	0.037563
38	7 468 982 057	0.064860
39	355 098 739	-

	Change in Total Domestic Absorption : $A_{1966} - A_{1958}$	Net Import Substitution : G.I.S. / $(A_{1966} - A_{1958})$	
20-22	13 196 263 470	0.062918	(Food-Drink-Tobacco)
23	4 516 000 152	0.046247	(Textiles)
24	44 185 537	-	(Clothing-Footwear)
25-26	2 666 376 922	-	(Wood-Cork-Furniture)
27-28	2 894 002 920	0.076848	(Paper-Printing)
29-32	7 338 714 955	0.284918	(Leather-Rubber-Plastics-Chemicals-Petrol)
33	2 827 830 426	-	(Non-metallic Minerals)
34	2 343 612 604	0.052289	(Basic Metal Industries)
35-37	10 295 433 448	0.029270	(Metal Prod.-Machinery-Electr.Equipment)
38	6 274 885 755	0.077203	(Transport Equipment)
39	524 398 983	-	(Miscellaneous Industries)

Note : All entries in drachmas are at current prices.

To obtain a measure of G.I.S. weighted by the proportional growth in imports I first developed an index of growth in imports. Had imports grown in proportion to A then in the end of the period imports would have been equal to $m_{1958}(A_{1966})$.(1) Obtaining the $m_{1958}(A_{1966})$ estimates throughout, I then calculate the G.I.S. / $m_{1958}(A_{1966})$ ratio. The ratio of Gross Import Substitution to proportional growth in imports can conceivably vary from zero (the no-substitution case) to one (the complete-substitution case). The highest rate is in food etc. industries (20-22), followed by chemicals etc. (29-32) and paper industries (27-28). Complete results are given in Table XXII .

A further step will give us an estimate of net import substitution in the context of the Chenery formulation. Net values are obtained by setting the Gross Import Substitution estimates against the relative increase in absorption in the period. I first obtain the $A_{1966} - A_{1958}$ changes and then derive G.I.S. as share of those changes. The results are given in Table XXII . Again chemicals and allied industries show a high rating, followed at a much lower level by a group of industries including transport equipment, paper-printing, food-drink-tobacco, and basic metal industries. Net import substitution at a lower level is seen in metal products, machinery and electrical equipment. What the rates of net import substitution indicate is that by the end of the period Greek purchasers had substituted domestic supplies for imports to the extent of a percentage of the increase in their total purchases of manufactured products from the beginning of the period.(1)

Another relevant question to be answered is to what degree was the growth of Greek manufacturing industry dependent upon such a replacement of domestic for imported manufactures. In other words how much of the increase in manufacturing production for use in Greece over that period of time was due to import replacement, and therefore at the expense of foreign manufacture importers. Im-

(1) Cf. Harold G. Vatter: "An Estimate of Import Substitution for Manufactured Products in the U.S. Economy, 1859 and 1899", Economic Development and Cultural Change, Vol. 18, 1969-1970, p. 40 ff.

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TABLE XXIII

A Measure of Import Replacement

	Gross Production Value Excluding Exports : P - X		Increase in Gross Production Value Retained at "Home" (i.e. excluding exports): $(P_{1966} - X_{1966}) - (P_{1958} - X_{1958})$
	1958	1966	
20-22	13 551 986 979	26 444 963 203	12 892 976 224
23	6 277 379 616	10 092 324 281	3 814 944 665
24	4 704 088 189	4 618 777 146	- 85 311 043
25-26	2 010 199 173	3 923 332 263	1 913 133 090
27-28	1 421 376 002	3 774 077 000	2 352 700 998
29-32	3 468 969 892	9 076 371 839	5 607 401 947
33	1 622 349 542	4 118 039 077	2 495 689 535
34	799 210 554	2 001 938 709	1 202 728 155
35-37	3 783 820 088	9 616 757 718	5 832 937 630
38	608 964 055	2 344 529 581	1 735 565 526
39	642 700 289	596 619 089	- 46 081 200

	Import Replacement : G.I.S. / $(P_{1966} - X_{1966}) - (P_{1958} - X_{1958})$	
20-22	0.064398	(Food-Drink-Tobacco)
23	0.054746	(Textiles)
24	-	(Clothing-Footwear)
25-26	-	(Wood-Cork-Furniture)
27-28	0.094529	(Paper-Printing)
29-32	0.372888	(Leather-Rubber-Plastics-Chemicals-Petrol)
33	-	(Non-metallic Minerals)
34	0.101888	(Basic Metal Industries)
35-37	0.051663	(Metal Products-Machinery-Electr.Equipment)
38	0.279125	(Transport Equipment)
39	-	(Miscellaneous Industries)

Note : Drachma entries at current prices.

port replacement is defined as the ratio of gross import substitution to the change in domestic production minus exports. Setting therefore import replacement I.R. = $\frac{G.I.S.}{(P_{1966} - X_{1966}) - (P_{1958} - X_{1958})}$ we obtain results as on Table XXIII.

Again chemicals etc. (29-32) have a high rate, followed by transport equipment (38) and at a lower level by basic metal industries (34) and paper-printing (27-28). Import replacement takes account of the relative price changes leading to a substitution of domestic production for an imported good, ignoring the effect of "normal" growth in intermediate demand (interindustry use of imported inputs in production) whether for raw materials or capital goods, or final demand (including income-induced demand for importables in consumption). The implication is that with competitive imports in one branch of the industry fully replaced by domestic substitutes, the rate of growth of the latter can be expected to decline as one source of demand (import replacement) declines. The pure import replacement estimates indicate in just which branches this is likely to happen. Policies affecting demands for factor inputs in exportables relative to total supply and also affecting demands for the exportables per se ought to be considered, should such a decline in pure-import-substitute-growth occur.(1)

One last feature of my results which deserves some comment is the absence of import substitution estimates at the total manufacturing industry level. The reason why such estimates are not given is that at the total industry level they are weaker indicators than at the sectoral level where they are generally thought to be more sensitive. The phenomenon is confirmed by Clark,(2) and has also been

(1) K. Raj and A.K. Sen: "Alternative Patterns of Growth under Conditions of Stagnant Export Earnings", Oxford Economic Papers, February 1961, 13, p. 43 ff.
D.B. Humphrey: "Note on Import Substitution: The Case of Brazil", Journal of Development Studies, October 1966, 3, pp. 76-86.
Harold Vatter: Op.cit., p. 42.

(2) Peter B. Clark: Op.cit., p. 26.

detected in Desai's Study of import substitution for the Indian economy.(1) In Desai's case there has been positive import substitution in the three subsectors of the economy, but negative import substitution (no import substitution) with all sectors taken together.

This curious feature has recently been examined by other authors in the context of an open Leontief model.(2) It is explained that "to replace an import, production must rise not only in the final processing industry, but also in the industries supplying its inputs and in their supplier industries, etc. (...) The newly required intermediates were previously supplied indirectly or directly by the importation of the final product. The replacement of implicit imports is import substituting every bit as the direct substitution captured by Chenery's measure, but will be missed by the usual definitions of imports and total supply".(3) In such a case Chenery's measure would involve a rise in imports by the full amount of the extra intermediate demands and gross output would fail to capture any of the potential growth. Just in the same manner the alternative method of using the open Leontief model (rather than the Chenery formulation) would fail to record the expansion in intermediate demand in an industry for which such an increase in demand for its output represents a potential source of growth. In this case the Leontief model would record no demand expansion and no import substitution; the Chenery model would record the expansion only to have it offset by negative import substitution: imports would rise in this case by the full amount of the extra intermediate demands.

The relative merits, or rather the relative defects of the two models become in our case a little academic, since in the case of

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(1) Padma Desai: "Growth and Structural Change in the Indian Manufacturing Sector: 1951-1963", Indian Economic Journal, October-December 1969, p. 322, Table I, Col. (4) and (5).

(2) I should like to thank professor A.G. Ford for bringing this to my attention. Also see:
George Fane: "Consistent Measure of Import Substitution", Oxford Economic Papers, July 1973, p. 252 ff.

(3) Samuel A. Morley and Gordon W. Smith: "Import Substitution and Foreign Investment in Brazil", Oxford Economic Papers, March 1971, p. 122.

the Greek economy we do not even have the point of departure in the form of two input-output tables required at two different points in time for the alternative approach. We therefore use the Chenery formulation and observe that at a higher level of disaggregation the findings are more accurate. This is why I do not present estimates for the entire manufacturing industry in the accompanying tables.(1)

One could add that such estimates of import substitution as I have developed, would, in view of lack of statistical documentation, out of necessity disregard a number of important issues. Those results do not take account of the likely positive influence of import substitution for manufactured goods on the imports of non-manufactured commodities.(2) Nor do they take account of the fact that the import content of manufactured exports may be different from that of domestically consumed manufactures. The import content of exports in this case is assumed to be the same as that of the home-market manufactures in terms of semi-manufactures etc. Furthermore the interindustry linkage effects associated with a substitution policy have not been analysed. The importance of such linkage effects will be considered in the next part of this thesis.

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(1) One has to note (and this is not made clear in the literature) that even if the Chenery indicator is quite sensitive at the sector level, it is still not entirely appropriate to identify a decrease in the imports/total-absorption ratio with a reduction in import substitution and not with export "atrophy" in such cases where exports have decreased as a proportion of total production. The measure is therefore a combined index of the effects of both import substitution and export creation at the same time.

(2) C.F. Diaz-Alejandro: "On Import Intensity of Import Substitution", Kyklos, Fasc. 3, 18, 1965, pp. 495-509.
W. van Rijckeghem: "The Import Intensity of Import Substitution: A Comment", Kyklos, Fasc. 2, 19, 1966.

APPENDIX TO CHAPTER SIX

External Trade of Commodities Classified by Producing Sector of the Manufacturing Industry

IMPORTS : Years 1953, 1954, 1958, 1959.
By Statistical Code Number of the National Statistical Service of Greece:
Ref.: N:5 External Trade – Foreign Trade of Greece.

20-22
Food-Drink-Tobacco

37	80	183	341	379
38	81	183/1	342	380
39	82	210	343	381
40	83	213	344	382
41	84	233	345	1494/3
42	85	234	346	1494/4
43	86	235	347	1494/6
44	87	236	348	1994/4
45	95	255/1	349	
46	96	255/2	351	
47	97	261	353	
48	98	262	354	
49	99	288	356	
50	110	289	357	
51	110/1	290	358	
52	111	291	359	
53	126	292	360	
54	127	293	361	
55	128	294	363	
55/1	129	295	364	
56	131	296	365	
59	132	323	367	
60	133	325	368	
60/1	134	326	369	
60/2	143	327	370	
61	144	327/1	371	
62	145	327/2	371/1	
63	152	329	372	
64	153	331	372/2	
65	156	332	373	
67	157	333	374	
68	158	334	375	
69	159	338/1	375/1	
70	160/1	338/2	375/2	
71	160/2	338/3	376	
73/1	161	339	377	
73/2	182	340	378	

23
Textiles

427	1800/1	1834	1866	1897	1932
1130	1801	1835	1867	1898	1934
1146	1802	1840	1868	1899	1935
1150	1803	1841	1869	1899/1	1936
1483	1804	1842	1870	1899/2	1937
1484	1805	1843	1871	1900	1938
1485	1806	1844	1872	1901	1939
1486/1	1807	1845	1873	1902	1940
1777	1808	1846	1874	1903	1941
1778	1809/1	1848	1875	1903/1	1942
1779	1809/2	1848/1	1876	1903/2	1947
1782	1809/3	1848/3	1877	1904	1948
1783	1810	1848/4	1878	1904/1	1949
1784	1811	1850/1	1879	1904/2	1950
1785	1812	1850/2	1880	1904/3	1951
1786	1813	1851	1881	1904/4	1952
1787	1814/1	1852	1882	1904/5	1952/3
1788	1814/2	1853	1883	1904/6	1952/3/1
1789	1814/3	1854	1884	1905	1952/3/2
1790	1814/4	1854/1	1885	1906	1952/4
1791	1815	1854/2	1886	1907	1952/4/1
1792/1	1816	1855	1887	1908	1952/4/2
1794	1818/1	1856	1888	1909	1952/5
1795	1818/2	1857	1889	1910	1952/5/1
1796	1818/3	1857/1	1890	1911	1952/5/2
1796/1	1818/4	1858	1891	1912	1952/6
1797/1	1818/5	1859	1892	1913	1952/6/1
1797/2	1819	1860	1893	1914	1952/6/2
1797/3	1820	1860/1	1893/1	1915	1952/9
1797/5	1821	1860/2	1893/2	1916	1952/9/1
1798	1824	1861	1893/3	1917	1952/9/2
1798/1	1825	1861/1	1894	1918	1952/9/3
1798/2	1827	1861/2	1894/1	1927	1952/10
1799	1829	1862	1894/2	1928	1952/11
1799/1	1830	1863	1894/3	1929	1952/12/1
1799/2	1831	1864	1895	1930	1952/13/1
1800	1833	1865	1896	1931	1952/13/2

(Continued)

23 (Continued)
Textiles

1952/14
1952/14/1
1952/14/2
1952/14/3
1952/14/4
1952/15
1952/15/1
1952/15/2
1952/15/3
1952/15/4
1952/16
1952/17
1952/18/4
1956
1956/1
1956/2
1956/4
1957
1957/1
1957/2
1957/4
1957/5
1958
1958/1
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1958/3
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1959/1
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1960/1
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1961
1961/1
1961/2
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1962/1
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2009/1
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2009/3
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2016/1
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2059
2059/1
2059/2
2136
2139
2273
2275
2301
2305
2306
2307
2317
2363

24
Clothing-Footwear

404
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1838/1
1838/4
1838/5
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1943
1944
1945
1946
1947/1
1947/2
1947/3
1947/4
1947/5
1952/7/1
1952/7/2
1952/7/3
1952/7/4
1952/8/1
1952/8/2
1952/8/3
1952/8/4
1952/18/1
1952/18/2
1952/18/3
1952/19/1
1952/19/2
1952/19/3
1985
1987
1988
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1994
1994/1
1996
1997
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2095
2096
2101
2102
2105
2106
2107/1
2107/2
2107/3
2108
2109/1
2110/1
2110/2
2111
2112
2113
2114
2115
2116
2117
2118
2119
2120
2121
2123
2125
2321
2365

25-26
Wood-Cork-Furniture

478
478/1
478/2
479
479/1
479/2
480
480/1
481
481/1
481/2
482
482/1
482/2
483
483/1
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485/1
485/2
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487/1
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488/1
488/2
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1158
2060
2061
2062
2064
2065
2071
2233
2238/2
2254/2
2254/3
2254/4
2262
2262/1
2262/2
2272
2277
2278
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2283
2286
2287
2288
2289
2290
2295
2296
2297
2298
2299
2333/3
2333/4
2336/1

27-28
Paper-Printing

888	1644	1694/1
1133/2	1645	1694/2
1190	1646	1695
1482/2	1647	1696
1506	1648	1698/1
1540/2	1649	1698/2
1606	1651	1698/3
1607	1652	1698/4
1608	1653	1699
1609	1654	1700
1610	1655	1702
1611	1656	1703
1612	1657	1704
1612/1	1658	1705
1612/2	1659	1706
1612/3	1660	1707
1613	1661	1708
1614	1662	1709
1615	1663	1710
1616	1664	1711
1617	1665	1712
1618/1	1666	1713
1618/2	1667	1714
1618/3	1668	1715
1619	1671	1716
1620	1672	1717/2
1621	1673	1718
1622	1674	1719
1622/1	1675	1720/1
1622/2	1676	1720/2
1623	1677	1721
1624	1678	1722
1625	1679	1723/1
1626	1680	1723/2
1627	1681	1723/3
1628	1682	1724
1629	1683	1725
1630	1683/1	1725/1
1631	1683/2	1725/2
1632	1684	1729
1633	1685	1731
1634	1686	1732
1635/1	1687	2140
1635/2	1688	2142
1636	1689	2217
1637	1690	2261
1638	1690/1	2291
1639	1690/2	2292
1640	1690/3	
1641	1691	
1642	1693	
1643	1694	

29-32
Leather-Rubber-Plastics-Chemicals-Petrol

57	425	695/1	1327	1379	1417	1477	1531
58	430	695/2	1328	1380	1418	1478	1532
297	431	890	1329	1381	1419	1479/1	1533
299	432	892	1330	1381/1	1420	1479/2	1534
301	433	893	1331	1381/2	1420/1	1480	1536
302	434	1148/2	1332	1382	1420/2	1481	1537
313	436	1152/1	1333	1383	1423	1482/1	1538
314	440	1152/2	1334	1384	1424	1486/2	1539
315/1	444	1155/3	1336	1385	1425	1486/3	1540/1
315/2	445	1237	1337	1386	1426	1487	1541
315/3	446	1289	1339	1389	1427	1488	1542
315/4	447	1290	1340	1390	1428/1	1491	1543
316	453	1290/1	1341	1391	1428/2	1494/1	1546
317	454	1290/2	1342	1392	1429	1494/5	1551
319	455	1291	1343	1393	1430/1	1494/6	1552
320	455/1	1292	1344	1394	1430/2	1494/7	1553/2
331	455/2	1293	1345	1394/1	1431/2	1494/8	1554
335	456	1294	1346	1394/2	1432/2	1494/9	1555
336	457	1295	1347	1394/3	1433/1	1494/10	1556
387	458	1296	1348	1394/4	1433/2	1494/11	1557
387/1	459	1297	1349	1394/5	1433/3	1497	1558
388	460	1298	1350	1394/6	1433/4	1498	1559
389	462	1300	1351	1395	1433/5	1499	1560
390	463	1301	1352	1396	1436	1499/1	1561
391	464	1302	1353	1397	1439	1499/2	1562
392	465	1303	1354	1398	1440	1500	1563
393	466	1304	1356	1399	1441	1501	1564
394	566	1305	1357	1399/1	1442	1502	1565
396	567	1306	1358/1	1399/2	1443	1503	1566
397	568	1307	1358/2	1400	1453	1504	1567
397/1	645	1308	1359	1401	1454	1505/1	1569
398	646	1309	1360	1402	1455	1505/2	1570
399/1	647	1310	1361	1403/1	1456	1511	1571
399/2	648	1311	1362	1403/2	1457	1512	1574
399/3	653	1312	1363	1403/3	1458	1513	1575
399/4	654	1313	1364	1403/4	1459	1514	1576
399/5	655	1314/1	1365	1403/5	1460	1516	1577
399/6	656	1314/2	1366	1404	1461	1517	1578
400/1	679	1315	1367	1405	1462	1518	1579
400/2	686	1316	1368	1405/1	1463	1519/1	1580
402	687	1317	1369	1405/2	1464	1519/2	1580/1
402/1	688	1318	1370	1406	1465	1520	1580/2
402/2	689	1319	1371/1	1407	1466	1521	1581
403/1	690	1320	1371/2	1408	1467	1523	1582
403/2	691	1321	1372/1	1410	1468	1524	1583
403/3	692	1322	1372/2	1411	1469	1525	1584
418	693	1323	1372/3	1411/1	1470	1526	1585
419	694	1324	1374	1411/2	1471	1527	1586
421	694/1	1324/1	1375	1412	1472	1528/1	1587
422	694/2	1324/2	1376	1413	1473	1528/2	1588
423	694/3	1325	1377	1415	1474	1530/1	1589
424	695	1326	1378	1416	1475	1530/2	1590

(Continued)

29-32 (Continued)
Leather-Rubber-Plastics-Chemicals-Petrol

1591	1758/3	2210/2
1592/1	1758/4	2221
1592/2	1759/1	2221/1
1592/3	1759/2	2222
1592/4	1759/3	2265
1593	1759/4	2266/1
1593/1	1760	2266/2
1593/2	1761	2268
1593/3	1762	2269
1593/4	1763	2280
1593/5	1765	2322
1593/6	1766	2323
1594	1767	2324
1594/1	1769	2325
1595	1770	2326
1599	1771	2329
1600	1952/1/1	2331
1601	1952/1/2	2332
1602	1952/1/3	2338
1603/2	1952/1/4	2339
1669	1952/2/1	2340
1670	1952/2/2	2342
1733	1952/9	2361
1734	1952/9/1	2362
1734/1	1952/9/2	2363
1734/2	1952/9/3	2364
1735	1952/10	2365
1736	1952/11	
1737	1952/12/1	
1738	1952/13	
1739	1952/13/1	
1740/1	1952/13/2	
1740/2	2072	
1740/3	2162	
1741	2162/1	
1742	2162/2	
1743	2162/3	
1744	2163	
1745	2164	
1746	2165	
1747	2165/1	
1748/1	2165/2	
1748/2	2165/3	
1749	2200	
1753	2202	
1754	2203	
1755	2204	
1756	2205	
1757	2206	
1757/1	2207	
1757/2	2208	
1758/1	2209	
1758/2	2210/1	

33
Non-metallic Minerals

638	1219/1	1254
639	1219/3	1255
641	1219/7	1257/1
642	1219/9	1257/2
643	1219/10	1258
644	1221/1	1259
649	1221/2	1259/1
650	1222	1259/2
651	1223	1260
652	1224	1260/1
657	1225	1260/2
658/1	1226	1261
658/2	1227	1261/1
659/1	1228	1261/2
659/2	1229/1	1262/1
659/3	1229/2	1262/2
659/4	1230	1263
659/6	1231	1264
660	1232/1	1265
661	1232/1/2	1266
662	1232/2	1267
666	1232/3	1268
667	1233	1268/1
668	1233/1	1268/2
669	1233/2	1269
670	1234	1270
671	1235	1271
672	1236/1	1272
675	1236/2	1273
676	1237	1274
677/1	1238	1275
677/2	1239	1276
678	1240	1277
680/3	1241	1279
684	1242	1280
881	1243	1281
882	1244	1282
1112/2	1245	1283
1118	1245/1	1284
1164	1245/2	1285
1168	1245/3	1286
1208	1246	1287
1209	1246/1	1288
1210	1246/2	1494/2
1211	1247	2070
1211/1	1247/1	2260
1211/2	1247/2	
1213	1248	
1214	1249	
1214/1	1250	
1215	1251	
1216	1252	
1219	1253	

34
Basic Metal Industries

696	1008
697	1009
698	1010
699	1011
701	1012
702	1012/1
703/1	1012/2
703/2	1013
703/3	1014
703/6	1015
704	1016
705	1017
705/1	1018/1
705/2	1018/2
705/3	1039
705/4	1041
705/5	1045
706	1047
707	1048/2
708	1049/1
708/1	1049/3
708/2	1053
708/3	1054
709	1055
709/1	1062
709/2	1064
710	
710/1	
710/2	
710/3	
710/4	
711/1	
711/2	
712	
713/1	
713/2	
713/3	
713/4	
713/5	
713/6	
769/2	
980	
982	
983	
987	
992/1	
992/2	
993/1	
993/2	
994	
1000	
1001	
1002	

EXPORTS : Years 1953, 1954, 1958, 1959.
By Statistical Code Number of the National Statistical Service of Greece:
Ref.: N:5 External Trade - Foreign Trade of Greece.

20-22 Food-Drink-Tobacco			23 Textiles			24 Clothing-Footwear	
39	213	368	427	1897	1959	404	1952/19/4
40	232	369	1146	1898	1959/1	405	1985
41	234	370	1779	1899	1961	407	1987
42	255/1	371	1794	1899/1	1961/1	408	1988
45	256	372	1796/1	1901	1962	409	1989
46	257	372/1	1797/3	1902	1962/1	410	1990
47	261	372/2	1797/4	1903/2	1962/4	411	1994/1
48	262	373	1797/5	1904/2	1962/10	412	1996
49	275	374	1799/1	1904/3	1963	413	1997
50	283	375	1800	1905	1964	414	2041
51	284	375/1	1800/1	1910	1965	435	2045
56	285	375/2	1800	1911	1966	437	2050
59	286	376	1806	1915	1968	441	2057
60	287	377	1816	1916	1970	442	2039
60/1	288	379	1818	1917	1974	450	2091
60/2	289	380	1818/1	1919	1978	451	2105
62	294	381	1818/4	1920	1978/1	452	
80	297	2345	1829	1927	1978/2	467	
81	298	2346	1834	1930	1978/3	468	
82	308	2350	1845	1934	1988	469	
83	321		1846	1935	1992	1148/1	
84	322		1848	1936	1993	1763	
85	323		1848/1	1937	1998	1921	
86	324		1848/3	1938	2003	1922	
87	325		1850	1939	2004	1923	
89	326		1851	1940	2005	1924	
90	327/2		1852	1942	2008	1925	
96	329		1853	1946	2009	1926	
97	330		1854	1947/1	2009/3	1929	
99	331		1854/1	1948	2013	1943	
102	332		1854/2	1950	2017	1944	
103	333		1856	1952	2023	1945	
103/1	338/1		1857	1952/3	2024	1946	
111	339		1857/1	1952/3/1	2025	1947/2	
128	340		1860/1	1952/4	2029	1947/3	
131	342		1861	1952/4/1	2031	1947/5	
134	343		1861/1	1952/5	2048	1952/7/1	
142	344		1861/2	1952/5/1	2056	1952/7/2	
151/2	345		1862	1952/5/2	2139	1952/7/4	
155	346		1863	1952/6/1	2305	1952/8/1	
156	349		1864	1952/14/1		1952/8/2	
157	351		1865	1952/16		1952/8/3	
161	352		1866	1953/2		1952/8/4	
182	354		1867	1954/2		1952/18/1	
183	356		1868	1956		1952/18/2	
183/1	359		1871	1956/4		1952/18/4	
210	360		1877	1957		1952/19/1	
211	367		1885	1958		1952/19/3	

25-26 Wood-Cork-Furniture

479	2288
480	2313
487	2336/2
491	
492	
492/1	
493	
497	
499	
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536/2	
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541	
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543	
544	
546	
548	
550	
552	
573/1	
584	
585	
589	
2060	
2071	
2262/2	
2277	
2283	
2286	

27-28 Paper-Printing

1482/2	2140
1609	2141
1611	2217
1612/1	
1615	
1618/1	
1621	
1622/2	
1639	
1644	
1649	
1665	
1668	
1669	
1679	
1680	
1681	
1683/1	
1685	
1689	
1690	
1690/1	
1690/3	
1696	
1697	
1698/1	
1698/2	
1702	
1703	
1704	
1705	
1707	
1708	
1709	
1710	
1711	
1712	
1713	
1714	
1717/1	
1717/2	
1718	
1719	
1720/1	
1720/2	
1721	
1722	
1724	
1725	
1725/1	
1725/2	
1726	
1732	

29-32 Leather-Rubber-Plastics-Chemicals-Petrol

58	1388	1528/1	2210/1
302	1389	1530/1	2266/2
387/1	1390	1530/2	2322
388	1391	1531	2323
393	1392	1532	2329
394	1394	1533	2332
396	1394/1	1538	2333/2
397	1394/4	1539	2361
398	1394/5	1543	2362
399/1	1394/6	1544	2366
399/2	1395	1545	
418	1400	1562	
421	1403/1	1563	
427	1403/2	1574	
430	1404	1575	
431	1405	1580	
433	1405/1	1580/1	
434	1412	1581	
444	1416	1582	
445	1424	1583	
453	1428/1	1585	
462	1428/2	1586	
463	1440	1587	
464	1446	1590	
465	1459	1592/1	
466	1461	1592/2	
566	1463	1592/3	
568	1465	1593/1	
586	1467	1593/2	
692	1471	1600	
693	1477	1669	
1290	1478	1733	
1290/1	1479/2	1734	
1290/2	1480	1734/1	
1291	1481	1735	
1292	1482/1	1737	
1295	1494/1	1744	
1302	1494/3	1753	
1303	1494/6	1754	
1312	1494/8	1757/2	
1317	1494/11	1758/1	
1319	1495	1758/3	
1320	1496	1759/4	
1321	1502	1952/1	
1324/1	1505/2	1952/2	
1330	1517	2072	
1343	1519/1	2162	
1350	1520	2162/1	
1352	1521	2162/2	
1357	1522	2165/1	
1366	1524	2165/2	
1368	1525	2200	
1381/1	1526	2206	

33 Non-metallic Minerals

597
600
602
619
625
632
633
634
638
643
644
650
656
657
658/1
658/2
659/1
659/3
659/6
660
661
666
676
677/1
678
881
1168
1208
1209
1212
1213
1213/1
1215
1216
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1225
1226
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1228
1229/1
1230
1232
1233
1233/1
1234
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1236/1
1239
1241
1243
1243/1
1244
1245
1246
1251
1254
1255
1257/1
1259
1259/1
1261
1261/1
1262/1
1267
1268
1268/1
1268/2
1269
1270
1271
1276
1282
2070

34 Basic Metal Industries

697
698
702
703
703/1
704
705/1
705/2
706
707
708/1
708/3
709
709/1
709/2
710
710/1
710/2
714
715
769/1
769/2
980
981
1001
1008
1009
1010
1012/1
1013
1015
1016
1018/2
1039
1041
1045
1046
1047
1048/1
1048/2
1049/2
1054

35-37 Metal Products-Machinery-Electr.Equipment

713/7
714
715
716
717
718
719/2
721
729
730
731
732
734
735
737
738
740
741
741/1
742
744
747
749
750
751
753/2
754
755
756
757
760
762
764
767
768
769
770
771
774
775/1
775/2
777/1
782
784/1
785
786
787
792
794
797
799
800
801
806
809
810
814
816
819/2
820/2
823
823/1
825
826
830
834/2
838
839
844
847
848
849/1
850
851
851/1
851/2
856
857
858
859
862
863
864
868
869
870
874
875
877
879
879/1
879/2
880
883
884
885/1
885/2
885/3
887
889/2
894
897
899
900
901
902
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909
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911
912
913
914
915
916
917
919/1
919/4
920
921
922
923/1
923/2
924
925
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927
927/1
928
928/1
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931
932
936
936/1
936/2
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949
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961
962
963/1
963/2
963/3
963/4
964
965
966
967
970
973
974
975
976
979
984
990
1006/1
1006/2
1012
1012/2
1021
1022
1023
1024
1025
1027
1032/1
1033
1035
1036
1038
1043
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1048
1049/4
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1052/1
1052/2
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1069
1105
1106
1107
1107/1
1109
1112/2
1112/3
1114/1
1116
1117
1117/1
1118
1119
1119/1
1119/2
1119/3
1119/6
1120
1121/3
1121/4
1122

(Continued)

35-37 (Continued) Metal Prod.-Machinery-Electr.Equipm.	38 Transport Equipment	39 Miscellaneous Industries
1122/3	2147	632/4
1122/4	2151	1029
1123	2167	1030
1126/1	2168	1031
1126/2	2168/1	1034
1126/3	2168/2	1070
1126/4	2169	1077
1126/6	2169/1	1078
1126/7	2169/2	1079
1126/8	2172	1080
1126/10	2243	1092
2069	2244	1102
2189	2246	1141
2190	2249	1153
2191	2256	1155/2
2212		1167
2234		1177
2237		1180
2254/1		1181
2259/1		1183
2270		1189
		1190/2
		1191
		1192
		1206
		1726
		1727
		1728
		2073
		2075
		2318

IMPORTS : Years 1960, 1965, 1966.
By Statistical Code Number of the National Statistical Service of Greece:
Ref.: N:5 External Trade - Foreign Trade of Greece.

20-22
Food-Drink-Tobacco

02.05.01	12.02.00	16.05.22	20.06.02	23.03.01
02.06.01	13.03.03	17.01.02	20.06.21	23.03.11
02.06.11	13.03.04	17.02.02	20.07.11	23.04.11
03.02.29	13.03.07	17.02.03	20.07.12	23.07.00
03.02.31	15.01.00	17.02.21	20.07.13	24.02.01
04.01.21	15.02.01	17.03.01	20.07.21	24.02.02
04.02.01	15.02.11	17.03.11	21.01.01	24.02.03
04.02.02	15.04.01	17.04.01	21.01.11	29.25.11
04.02.03	15.04.11	17.04.02	21.02.01	29.25.12
04.02.04	15.06.11	17.04.03	21.02.02	29.26.01
04.02.11	15.06.21	17.04.06	21.03.01	33.04.01
04.03.01	15.07.11	17.04.07	21.03.11	38.10.11
04.03.11	15.07.21	17.05.01	21.04.00	
04.03.12	15.07.31	17.05.11	21.05.00	
04.04.01	15.07.32	18.04.00	21.06.01	
04.04.11	15.07.33	18.05.00	21.06.02	
04.04.12	15.07.34	18.06.01	21.06.21	
04.04.13	15.07.35	18.06.11	21.07.01	
04.04.14	15.07.37	18.06.21	21.07.11	
04.04.15	15.07.41	18.06.31	21.07.21	
04.04.16	15.07.44	18.06.41	22.01.12	
04.04.17	15.08.01	19.01.00	22.02.00	
04.04.18	15.08.11	19.02.01	22.03.01	
04.04.19	15.13.01	19.02.02	22.05.01	
04.04.20	15.13.02	19.02.11	22.05.02	
04.05.31	16.01.01	19.02.12	22.05.11	
07.03.11	16.01.11	19.03.00	22.05.12	
07.04.00	16.01.21	19.04.00	22.05.13	
08.12.11	16.01.31	19.05.00	22.05.14	
09.01.11	16.02.01	19.06.00	22.06.01	
09.01.21	16.02.11	19.07.00	22.06.02	
11.01.01	16.02.21	19.08.01	22.06.12	
11.01.11	16.03.00	19.08.11	22.07.12	
11.01.21	16.04.01	19.08.12	22.09.04	
11.01.22	16.04.02	19.08.21	22.09.05	
11.02.11	16.04.03	19.08.22	22.09.11	
11.02.21	16.04.04	19.08.31	22.09.12	
11.02.22	16.04.05	20.01.11	22.09.13	
11.02.31	16.04.11	20.01.22	22.09.21	
11.02.32	16.04.21	20.01.23	22.09.22	
11.05.00	16.04.22	20.01.31	22.09.23	
11.06.01	16.04.23	20.02.01	22.09.24	
11.07.00	16.04.24	20.02.21	22.09.25	
11.08.01	16.04.26	20.02.31	22.09.26	
11.08.02	16.05.01	20.02.32	22.10.01	
11.08.03	16.05.13	20.05.01	22.10.11	
11.08.04	16.05.14	20.05.11	23.01.00	
11.09.00	16.05.21	20.06.01	23.02.01	

23
Textiles

14.02.02	53.05.06
14.02.12	53.05.07
30.04.01	53.05.10
30.04.11	53.05.12
30.04.21	53.05.21
30.04.31	53.05.22
30.04.32	53.05.23
40.06.11	53.05.25
46.01.11	53.05.26
50.03.11	53.05.27
50.05.01	53.05.28
50.05.11	53.05.31
50.06.01	53.05.33
50.06.11	53.05.35
50.07.01	53.06.01
50.07.11	53.06.02
50.08.01	53.06.03
50.08.11	53.06.04
50.09.01	53.06.11
50.09.11	53.06.12
50.09.12	53.06.13
50.09.13	53.06.14
50.09.14	53.06.21
50.09.21	53.06.22
50.09.22	53.07.01
51.01.02	53.07.02
51.04.01	53.07.03
51.04.02	53.07.04
51.04.03	53.07.11
51.04.04	53.07.12
51.04.11	53.07.13
51.04.12	53.07.14
51.04.13	53.07.21
52.01.01	53.07.22
52.01.11	53.08.01
52.01.21	53.08.11
52.02.01	53.10.01
52.02.11	53.10.11
53.01.11	53.10.21
53.01.21	53.10.31
53.02.11	53.10.41
53.02.21	53.10.71
53.02.22	53.11.01
53.04.00	53.11.02
53.05.01	53.11.03
53.05.02	53.11.04
53.05.03	53.11.05
53.05.04	53.11.07

(Continued)

53.11.08	54.05.43	55.09.46	58.01.41	58.09.28	59.13.12	62.02.06
53.11.09	54.05.44	55.09.47	58.02.02	58.10.01	59.13.21	62.02.13
53.11.10	55.01.11	55.09.48	58.02.03	58.10.02	59.14.01	62.02.14
53.11.11	55.01.12	55.09.49	58.02.04	58.10.11	59.14.11	62.02.15
53.11.12	55.02.00	55.09.50	58.02.05	58.10.21	59.14.21	62.02.16
53.11.13	55.04.11	55.09.51	58.02.07	58.10.22	59.15.00	62.03.01
53.11.14	55.04.12	55.09.52	58.02.08	58.10.31	59.16.00	62.03.02
53.11.15	55.05.02	55.09.53	58.02.09	58.10.41	59.17.01	62.03.03
53.11.16	55.05.03	55.09.54	58.02.11	58.10.51	59.17.02	62.03.04
53.11.22	55.05.06	55.09.55	58.02.12	59.01.01	59.17.03	62.03.11
53.11.23	55.05.08	55.09.56	58.03.00	59.01.11	59.17.04	62.03.21
53.11.24	55.05.09	56.01.02	58.04.01	59.01.21	59.17.05	62.04.01
53.11.31	55.05.10	56.01.13	58.04.11	59.02.02	59.17.06	62.04.11
53.11.41	55.05.11	56.07.01	58.04.21	59.02.03	59.17.08	62.04.21
53.12.01	55.05.31	56.07.02	58.04.22	59.02.04	59.17.11	62.04.31
54.01.01	55.05.33	56.07.11	58.04.31	59.02.11	59.17.12	62.05.01
54.01.02	55.06.01	57.01.02	58.05.01	59.02.12	59.17.13	62.05.11
54.01.11	55.06.02	57.01.11	58.05.02	59.03.01	59.17.14	62.05.21
54.01.12	55.06.03	57.02.01	58.05.11	59.01.11	59.17.15	62.05.31
54.02.02	55.06.11	57.03.02	58.05.21	59.04.02	60.01.01	62.05.41
54.03.01	55.06.21	57.04.11	58.05.22	59.04.03	60.01.11	66.01.01
54.03.02	55.07.01	57.04.13	58.05.41	59.04.04	60.01.21	66.01.02
54.03.11	55.07.02	57.04.15	58.05.51	59.04.05	60.01.22	66.01.03
54.03.12	55.07.03	57.04.16	58.06.00	59.04.12	60.01.23	66.01.04
54.03.21	55.07.11	57.05.01	58.07.02	59.04.13	60.01.31	66.01.11
54.03.22	55.07.13	57.05.02	58.07.12	59.04.14	60.01.32	66.01.21
54.03.31	55.08.00	57.06.01	58.07.21	59.04.15	60.01.33	67.02.01
54.04.01	55.09.01	57.06.02	58.07.22	59.05.01	60.01.34	67.02.21
54.04.11	55.09.02	57.07.02	58.07.23	59.05.02	60.01.35	67.04.11
54.04.21	55.09.03	57.07.32	58.07.24	59.05.03	60.01.36	67.04.12
54.05.01	55.09.04	57.07.35	58.07.25	59.05.04	60.01.37	94.04.12
54.05.02	55.09.05	57.08.01	58.07.26	59.05.12	60.01.38	94.04.21
54.05.03	55.09.06	57.08.02	58.07.27	59.05.13	60.01.39	96.02.21
54.05.04	55.09.07	57.09.01	58.07.28	59.05.14	60.01.41	96.02.22
54.05.05	55.09.08	57.09.02	58.08.01	59.05.21	60.01.43	96.05.00
54.05.11	55.09.11	57.09.03	58.08.21	59.06.01	60.06.01	97.07.02
54.05.12	55.09.12	57.09.11	58.08.22	59.06.11	60.06.12	98.01.22
54.05.13	55.09.13	57.09.21	58.08.23	59.07.01	61.05.11	98.08.01
54.05.21	55.09.14	57.09.31	58.08.31	59.07.02	61.05.21	98.08.11
54.05.22	55.09.15	57.10.01	58.08.41	59.07.11	61.05.31	
54.05.23	55.09.16	57.10.02	58.08.42	59.07.21	62.01.01	
54.05.24	55.09.17	57.10.03	58.08.44	59.08.00	62.01.11	
54.05.25	55.09.18	57.10.11	58.08.51	59.09.01	62.01.21	
54.05.27	55.09.21	57.10.21	58.09.01	59.09.11	62.01.22	
54.05.28	55.09.22	57.10.31	58.09.04	59.09.21	62.01.23	
54.05.29	55.09.23	57.11.02	58.09.05	59.10.01	62.01.31	
54.05.30	55.09.24	57.11.11	58.09.07	59.10.11	62.01.32	
54.05.31	55.09.31	57.12.00	58.09.21	59.11.00	62.01.33	
54.05.32	55.09.41	58.01.01	58.09.22	59.11.01	62.01.41	
54.05.33	55.09.42	58.01.11	58.09.23	59.11.11	62.02.02	
54.05.35	55.09.43	58.01.21	58.09.24	59.12.01	62.02.03	
54.05.36	55.09.44	58.01.31	58.09.25	59.12.02	62.02.04	
54.05.42	55.09.45	58.01.32	58.09.27	59.13.11	62.02.05	

24
Clothing-Footwear

39.07.51	61.02.01	64.05.01	65.07.41
40.13.02	61.02.02	64.05.12	
40.13.03	61.02.03	64.05.21	
40.13.11	61.02.04	64.05.31	
40.13.12	61.02.05	64.05.51	
42.03.01	61.02.06	64.05.61	
42.03.11	61.02.11	64.06.11	
42.03.21	61.02.21	65.01.01	
42.03.22	61.02.31	65.01.02	
42.03.23	61.03.11	65.01.03	
42.03.31	61.03.21	65.02.01	
43.03.01	61.03.31	65.02.11	
43.03.11	61.04.21	65.02.12	
60.02.01	61.04.31	65.02.13	
60.02.02	61.04.32	65.02.14	
60.02.03	61.04.34	65.02.21	
60.03.01	61.04.41	65.03.01	
60.03.11	61.04.42	65.03.02	
60.03.12	61.06.01	65.03.04	
60.03.13	61.06.02	65.03.05	
60.03.21	61.06.11	65.03.11	
60.04.11	61.06.21	65.03.12	
60.04.12	61.06.31	65.03.13	
60.04.13	61.06.41	65.04.01	
60.04.14	61.06.51	65.04.02	
60.04.21	61.07.01	65.04.03	
60.04.31	61.07.11	65.04.04	
60.04.32	61.07.21	65.04.05	
60.05.01	61.08.00	65.04.13	
60.05.02	61.09.01	65.04.14	
60.05.03	61.09.11	65.04.16	
60.05.04	61.09.21	65.04.17	
60.05.05	61.10.00	65.04.19	
60.05.06	61.11.01	65.04.20	
60.05.11	61.11.11	65.05.01	
60.05.11	61.11.21	65.05.11	
60.05.12	64.01.01	65.05.21	
60.05.14	64.01.02	65.05.31	
60.05.15	64.01.11	65.05.32	
60.05.22	64.02.01	65.05.41	
60.05.23	64.02.02	65.05.42	
60.05.24	64.02.03	65.05.43	
60.06.11	64.02.04	65.05.51	
61.01.01	64.02.11	65.05.71	
61.01.02	64.02.13	65.05.82	
61.01.03	64.02.14	65.05.91	
61.01.04	64.02.15	65.05.92	
61.01.05	64.03.11	65.05.93	
61.01.06	64.03.17	65.06.31	
61.01.11	64.04.11	65.06.41	
61.01.12	64.04.12	65.06.51	
61.01.21	64.04.13	65.06.61	
61.01.31	64.04.31	65.07.01	

25-26
Wood-Cork-Furniture

14.01.01	44.22.11	94.02.00
14.01.12	44.23.01	94.03.01
14.01.32	44.23.12	94.03.11
44.01.01	44.24.00	94.03.12
44.03.31	44.25.01	94.03.13
44.04.01	44.25.02	94.03.14
44.04.02	44.25.11	95.08.01
44.04.22	44.25.21	96.01.00
44.05.01	44.25.31	96.02.01
44.05.02	44.25.41	96.02.02
44.05.03	44.26.01	96.02.03
44.05.06	44.26.11	96.02.04
44.05.07	44.27.01	96.02.31
44.05.08	44.27.11	96.02.41
44.05.13	44.27.21	96.02.42
44.05.14	44.28.01	96.02.43
44.05.21	44.28.11	96.02.44
44.05.22	44.28.21	96.04.00
44.07.00	44.28.31	96.05.00
44.08.00	44.28.32	97.04.13
44.09.21	45.01.11	97.04.14
44.10.00	45.02.01	98.11.01
44.11.01	45.02.11	98.11.02
44.12.00	45.03.01	98.11.11
44.13.01	45.03.11	
44.13.02	45.03.21	
44.13.03	45.03.31	
44.13.04	45.03.41	
44.13.05	45.03.42	
44.13.06	45.04.00	
44.13.07	46.02.01	
44.13.08	46.02.11	
44.13.11	46.02.21	
44.13.13	46.02.31	
44.13.14	46.03.01	
44.14.00	46.03.11	
44.15.01	46.03.21	
44.15.02	46.03.22	
44.15.03	46.03.23	
44.15.11	46.03.31	
44.17.00	66.02.02	
44.18.00	66.02.03	
44.19.02	66.02.04	
44.19.11	66.03.03	
44.19.12	66.03.04	
44.20.01	94.01.01	
44.20.02	94.01.11	
44.20.12	94.01.13	
44.20.21	94.01.14	
44.21.01	94.01.21	
44.21.11	94.01.22	
44.21.12	94.01.23	
44.22.01	94.01.24	

27-28

Paper-Printing

47.01.01	48.05.14	48.15.31	49.06.02
47.01.02	48.05.15	48.15.41	49.06.03
47.01.03	48.05.16	48.15.51	49.06.11
47.01.04	48.06.01	48.15.61	49.06.21
47.01.11	48.06.11	48.15.62	49.07.21
47.01.12	48.07.01	48.15.81	49.07.42
47.01.13	48.07.02	48.15.91	49.07.43
47.01.14	48.07.03	48.15.92	49.08.00
47.01.15	48.07.04	48.15.93	49.09.01
47.01.21	48.07.05	48.16.01	49.09.11
47.01.41	48.07.11	48.16.11	49.09.12
47.02.00	48.07.12	48.16.21	49.10.01
48.01.01	48.07.13	48.16.31	49.10.11
48.01.02	48.07.14	48.17.00	49.10.12
48.01.12	48.07.15	48.18.11	49.10.13
48.01.13	48.07.16	48.18.21	49.11.01
48.01.21	48.07.17	48.18.31	49.11.02
48.01.31	48.07.19	48.18.41	49.11.11
48.01.32	48.07.20	48.18.51	49.11.12
48.01.33	48.07.21	48.18.61	49.11.13
48.01.34	48.07.22	48.18.71	49.11.14
48.01.41	48.07.23	48.18.72	49.11.15
48.01.51	48.07.24	48.18.81	49.11.21
48.01.52	48.07.31	48.19.00	49.11.41
48.01.61	48.07.32	48.20.01	49.11.51
48.01.71	48.07.33	48.20.11	49.11.52
48.01.81	48.08.00	48.21.01	49.11.61
48.01.82	48.09.01	48.21.11	49.11.71
48.01.83	48.09.02	48.21.21	49.11.72
48.01.84	48.09.11	48.21.31	49.11.81
48.01.85	48.09.12	48.21.41	49.11.91
48.01.86	48.09.13	48.21.51	49.11.92
48.01.91	48.10.00	48.21.61	49.11.93
48.02.00	48.11.01	48.21.71	67.05.00
48.03.01	48.11.11	48.21.81	97.05.01
48.03.11	48.11.21	48.21.91	
48.03.12	48.12.00	48.21.93	
48.03.13	48.13.01	48.21.95	
48.03.14	48.13.11	49.01.01	
48.03.15	48.13.21	49.01.02	
48.04.01	48.14.01	49.01.11	
48.04.02	48.14.02	49.01.12	
48.04.03	48.14.03	49.02.01	
48.04.11	48.14.11	49.02.11	
48.04.12	48.14.21	49.02.21	
48.04.13	48.14.22	49.03.01	
48.04.14	48.14.31	49.03.02	
48.04.15	48.15.01	49.03.03	
48.05.01	48.15.02	49.03.11	
48.05.02	48.15.03	49.04.01	
48.05.11	48.15.04	49.04.11	
48.05.12	48.15.11	49.05.00	
48.05.13	48.15.21	49.06.01	

29-32

Leather-Rubber-Plastics-Chemicals-Petrol

12.07.25	27.10.63	28.16.12
13.03.05	27.10.64	28.17.01
13.03.06	27.11.01	28.17.11
13.03.21	27.11.02	28.17.21
15.05.01	27.12.00	28.17.31
15.05.11	27.13.01	28.18.01
15.05.31	27.13.11	28.18.11
15.07.42	27.13.12	28.18.21
15.07.45	27.13.21	28.19.01
15.08.01	27.14.01	28.19.11
15.08.11	27.14.11	28.20.01
15.09.00	27.14.21	28.20.02
15.10.01	27.16.01	28.20.11
15.10.02	27.16.11	28.21.01
15.10.11	27.16.21	28.21.11
15.10.12	27.16.31	28.22.00
15.10.21	28.01.02	28.23.01
15.11.01	28.01.11	28.23.02
15.12.01	28.01.21	28.23.03
15.12.02	28.02.01	28.23.11
15.12.11	28.02.11	28.23.21
15.12.12	28.03.00	28.24.01
15.14.00	28.04.01	28.24.11
22.08.01	28.04.11	28.25.00
22.08.11	28.04.21	28.26.00
22.09.02	28.04.22	28.27.01
25.01.11	28.04.23	28.27.11
25.09.01	28.04.24	28.27.21
27.06.00	28.04.25	28.28.01
27.07.02	28.04.31	28.28.01
27.07.03	28.05.01	28.28.11
27.07.11	28.05.21	28.28.21
27.07.16	28.05.31	28.29.01
27.07.17	28.06.01	28.29.11
27.07.18	28.06.02	28.30.01
27.17.20	28.06.11	28.30.02
27.17.21	28.08.01	28.30.03
27.08.01	28.08.02	28.30.04
27.10.01	28.08.11	28.30.05
27.10.02	28.09.01	28.30.11
27.10.03	28.09.02	28.31.01
27.10.04	28.10.11	28.31.02
27.10.11	28.11.01	28.31.11
27.10.21	28.11.11	28.32.01
27.10.31	28.12.01	28.32.02
27.10.32	28.13.01	28.32.03
27.10.33	28.13.02	28.32.11
27.10.34	28.13.11	28.33.01
27.10.35	28.14.11	28.33.02
27.10.41	28.15.01	28.33.03
27.10.51	28.15.11	28.33.04
27.10.61	28.16.01	28.34.01
27.10.62	28.16.11	28.34.02

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28.34.03	28.43.21	29.02.32	29.14.06	29.39.01	30.03.71	32.05.10
28.34.04	28.43.31	29.02.41	29.14.07	29.39.11	30.03.81	32.05.21
28.35.01	28.45.01	29.02.42	29.14.11	29.39.21	30.03.91	32.05.31
28.35.11	28.45.11	29.02.43	29.14.12	29.40.01	30.04.41	32.05.41
28.35.31	28.46.01	29.02.51	29.14.13	29.40.11	30.04.42	32.06.00
28.36.01	28.46.11	29.02.52	29.14.14	29.40.12	30.04.43	32.07.11
28.36.02	28.46.21	29.02.53	29.14.15	29.40.21	30.05.01	32.07.21
28.37.01	28.47.01	29.03.11	29.14.21	29.41.01	30.05.02	32.07.31
28.37.11	28.47.11	29.03.21	29.15.01	29.41.11	30.05.04	32.07.32
28.37.21	28.47.21	29.03.31	29.15.02	29.41.21	30.05.05	32.07.33
28.37.31	28.48.00	29.04.01	29.15.11	29.42.01	30.05.06	32.07.34
28.37.41	28.49.01	29.04.11	29.15.12	29.42.02	30.05.07	32.07.35
28.38.01	28.49.11	29.04.21	29.16.01	29.42.03	30.05.08	32.07.36
28.38.02	28.49.21	29.04.31	29.16.02	29.42.11	31.01.02	32.07.37
28.38.03	28.49.22	29.04.41	29.16.03	29.42.21	31.02.01	32.07.41
28.38.04	28.49.23	29.04.51	29.16.04	29.42.28	31.02.02	32.07.51
28.38.05	28.49.24	29.04.61	29.16.05	29.42.01	31.02.03	32.08.11
28.38.06	28.50.01	29.05.01	29.16.06	29.42.11	31.02.04	32.08.31
28.38.07	28.50.02	29.05.11	29.16.07	29.42.21	31.02.05	32.08.32
28.38.08	28.50.03	29.05.21	29.16.11	29.42.31	31.02.07	32.08.41
28.38.09	28.51.04	29.05.31	29.16.12	29.44.01	31.02.08	32.08.51
28.38.11	28.52.02	29.05.41	29.16.21	29.44.02	31.02.11	32.09.01
28.38.21	28.52.03	29.06.01	29.17.11	29.44.11	31.03.01	32.09.02
28.38.31	28.52.11	29.06.11	29.18.11	29.44.12	31.03.03	32.09.03
28.39.01	28.52.12	29.06.21	29.18.21	29.45.00	31.03.04	32.09.04
28.39.02	28.53.00	29.07.01	29.19.01	30.01.01	31.03.05	32.09.05
28.39.03	28.54.00	29.07.11	29.19.11	30.01.11	31.03.11	32.09.11
28.39.11	28.55.01	29.08.01	29.20.00	30.01.12	31.04.03	32.09.12
28.39.12	28.55.11	29.08.02	29.21.00	30.01.13	31.04.04	32.09.21
28.39.13	28.55.21	29.08.03	29.22.01	30.01.21	31.05.01	32.09.22
28.39.14	28.56.01	29.08.11	29.22.03	30.02.01	31.05.02	32.09.31
28.39.15	28.56.11	29.08.21	29.22.11	30.02.11	31.05.11	32.09.41
28.39.16	28.56.31	29.08.31	29.22.12	30.02.21	32.01.01	32.09.42
28.39.18	28.57.01	29.08.41	29.23.01	30.02.31	32.01.11	32.09.51
28.40.01	28.57.11	29.09.42	29.23.11	30.03.01	32.02.01	32.09.61
28.40.02	28.57.21	29.09.00	29.24.00	30.03.02	32.02.11	32.09.71
28.40.03	28.57.31	29.10.00	29.25.01	30.03.03	32.02.12	32.10.00
28.41.01	28.58.11	29.11.01	29.26.11	30.03.04	32.03.00	32.11.00
28.41.02	28.58.22	29.11.02	29.26.12	30.03.11	32.04.01	32.12.00
28.41.04	29.01.01	29.11.11	29.27.00	30.03.12	32.04.02	32.13.01
28.42.01	29.01.11	29.11.21	29.28.00	30.03.21	32.04.03	32.13.02
28.42.02	29.01.21	29.11.31	29.29.00	30.03.21	32.04.04	32.13.11
28.42.03	29.01.22	29.12.00	29.30.00	30.03.22	32.04.11	32.13.12
28.42.04	29.01.31	29.13.01	29.31.00	30.03.24	32.04.12	32.13.21
28.42.05	29.01.32	29.13.11	29.32.00	30.03.25	32.05.01	32.13.31
28.42.06	29.01.33	29.13.21	29.33.00	30.03.26	32.05.02	32.13.41
28.42.07	29.02.01	29.13.31	29.34.00	30.03.27	32.05.03	33.01.01
28.42.08	29.02.11	29.13.41	29.35.00	30.03.31	32.05.04	33.01.02
28.42.09	29.02.21	29.14.01	29.36.00	30.03.41	32.05.05	33.01.03
28.42.11	29.02.22	29.14.02	29.37.01	30.03.51	32.05.06	33.01.04
28.43.01	29.02.23	29.14.03	29.37.11	30.03.61	32.05.07	33.01.05
28.43.02	29.02.24	29.14.04	29.37.21	30.03.62	32.05.08	33.01.06
28.43.11	29.02.31	29.14.05	29.38.00	30.03.63	32.05.09	33.01.07

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28.34.03	28.43.21	29.02.32	29.14.06	29.39.01	30.03.71	32.05.10
28.34.04	28.43.31	29.02.41	29.14.07	29.39.11	30.03.81	32.05.21
28.35.01	28.45.01	29.02.42	29.14.11	29.39.21	30.03.91	32.05.31
28.35.11	28.45.11	29.02.43	29.14.12	29.40.01	30.04.41	32.05.41
28.35.31	28.46.01	29.02.51	29.14.13	29.40.11	30.04.42	32.06.00
28.36.01	28.46.11	29.02.52	29.14.14	29.40.12	30.04.43	32.07.11
28.36.02	28.46.21	29.02.53	29.14.15	29.40.21	30.05.01	32.07.21
28.37.01	28.47.01	29.03.11	29.14.21	29.41.01	30.05.02	32.07.31
28.37.11	28.47.11	29.03.21	29.15.01	29.41.11	30.05.04	32.07.32
28.37.21	28.47.21	29.03.31	29.15.02	29.41.21	30.05.05	32.07.33
28.37.31	28.48.00	29.04.01	29.15.11	29.42.01	30.05.06	32.07.34
28.37.41	28.49.01	29.04.11	29.15.12	29.42.02	30.05.07	32.07.35
28.38.01	28.49.11	29.04.21	29.16.01	29.42.03	30.05.08	32.07.36
28.38.02	28.49.21	29.04.31	29.16.02	29.42.11	31.01.02	32.07.37
28.38.03	28.49.22	29.04.41	29.16.03	29.42.21	31.02.01	32.07.41
28.38.04	28.49.23	29.04.51	29.16.04	29.42.28	31.02.02	32.07.51
28.38.05	28.49.24	29.04.61	29.16.05	29.42.01	31.02.03	32.08.11
28.38.06	28.50.01	29.05.01	29.16.06	29.42.11	31.02.04	32.08.31
28.38.07	28.50.02	29.05.11	29.16.07	29.42.21	31.02.05	32.08.32
28.38.08	28.50.03	29.05.21	29.16.11	29.42.31	31.02.07	32.08.41
28.38.09	28.51.04	29.05.31	29.16.12	29.44.01	31.02.08	32.08.51
28.38.11	28.52.02	29.05.41	29.16.21	29.44.02	31.02.11	32.09.01
28.38.21	28.52.03	29.06.01	29.17.11	29.44.11	31.03.01	32.09.02
28.38.31	28.52.11	29.06.11	29.18.11	29.44.12	31.03.03	32.09.03
28.39.01	28.52.12	29.06.21	29.18.21	29.45.00	31.03.04	32.09.04
28.39.02	28.53.00	29.07.01	29.19.01	30.01.01	31.03.05	32.09.05
28.39.03	28.54.00	29.07.11	29.19.11	30.01.11	31.03.11	32.09.11
28.39.11	28.55.01	29.08.01	29.20.00	30.01.12	31.04.03	32.09.12
28.39.12	28.55.11	29.08.02	29.21.00	30.01.13	31.04.04	32.09.21
28.39.13	28.55.21	29.08.03	29.22.01	30.01.21	31.05.01	32.09.22
28.39.14	28.56.01	29.08.11	29.22.03	30.02.01	31.05.02	32.09.31
28.39.15	28.56.11	29.08.21	29.22.11	30.02.11	31.05.11	32.09.41
28.39.16	28.56.31	29.08.31	29.22.12	30.02.21	32.01.01	32.09.42
28.39.18	28.57.01	29.08.41	29.23.01	30.02.31	32.01.11	32.09.51
28.40.01	28.57.11	29.08.42	29.23.11	30.03.01	32.02.01	32.09.61
28.40.02	28.57.21	29.09.00	29.24.00	30.03.02	32.02.11	32.09.71
28.40.03	28.57.31	29.10.00	29.25.01	30.03.03	32.02.12	32.10.00
28.41.01	28.58.11	29.11.01	29.26.11	30.03.04	32.03.00	32.11.00
28.41.02	28.58.22	29.11.02	29.26.12	30.03.11	32.04.01	32.12.00
28.41.04	29.01.01	29.11.11	29.27.00	30.03.12	32.04.02	32.13.01
28.42.01	29.01.11	29.11.21	29.28.00	30.03.21	32.04.03	32.13.02
28.42.02	29.01.21	29.11.31	29.29.00	30.03.21	32.04.04	32.13.11
28.42.03	29.01.22	29.12.00	29.30.00	30.03.22	32.04.11	32.13.12
28.42.04	29.01.31	29.13.01	29.31.00	30.03.24	32.04.12	32.13.21
28.42.05	29.01.32	29.13.11	29.32.00	30.03.25	32.05.01	32.13.31
28.42.06	29.01.33	29.13.21	29.33.00	30.03.26	32.05.02	32.13.41
28.42.07	29.02.01	29.13.31	29.34.00	30.03.27	32.05.03	33.01.01
28.42.08	29.02.11	29.13.41	29.35.00	30.03.31	32.05.04	33.01.02
28.42.09	29.02.21	29.14.01	29.36.00	30.03.41	32.05.05	33.01.03
28.42.11	29.02.22	29.14.02	29.37.01	30.03.51	32.05.06	33.01.04
28.43.01	29.02.23	29.14.03	29.37.11	30.03.61	32.05.07	33.01.05
28.43.02	29.02.24	29.14.04	29.37.21	30.03.62	32.05.08	33.01.06
28.43.11	29.02.31	29.14.05	29.38.00	30.03.63	32.05.09	33.01.07

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29-32 (Continued)

Leather-Rubber-Plastics-Chemicals-Petrol

33.01.08	35.05.01	38.11.31	39.02.14	39.07.31	40.10.11	42.02.03
33.01.11	35.05.11	38.12.01	39.02.21	39.07.41	40.11.01	42.02.04
33.01.12	35.06.00	38.12.02	39.02.31	39.07.42	40.11.02	42.02.05
33.02.00	35.06.01	38.12.03	39.02.41	39.07.61	40.11.03	42.02.11
33.04.11	36.01.02	38.12.11	39.02.51	39.07.71	40.11.04	42.02.12
33.05.03	36.01.11	38.13.00	39.02.61	39.07.81	40.11.05	42.02.21
33.05.11	36.02.01	38.14.00	39.02.71	39.07.91	40.11.06	42.02.22
33.06.01	36.02.11	38.15.00	39.03.01	39.07.92	40.11.11	42.02.23
33.06.02	36.03.00	38.16.00	39.03.02	39.07.93	40.11.12	42.02.31
33.06.03	36.04.01	38.17.00	39.03.03	39.07.94	40.11.13	42.02.32
33.06.05	36.04.02	38.18.00	39.03.04	40.01.01	40.11.14	42.02.33
33.06.06	36.04.03	38.19.01	39.03.05	40.01.02	40.11.21	42.03.11
33.06.11	36.04.04	38.19.02	39.03.11	40.01.03	40.21.31	42.04.01
33.06.12	36.04.11	38.19.03	39.03.12	40.01.04	40.12.01	42.04.11
33.06.13	36.05.01	38.19.04	39.03.13	40.01.21	40.12.11	42.04.21
33.06.14	36.05.11	38.19.05	39.03.21	40.01.22	40.12.21	42.05.01
33.06.15	36.05.21	38.19.07	39.03.31	40.02.01	40.14.01	42.05.11
33.06.16	36.05.51	38.19.08	39.03.41	40.02.11	40.14.11	42.06.00
33.06.17	36.06.00	38.19.09	39.03.42	40.02.12	40.14.21	43.02.01
33.06.18	36.07.00	38.19.10	39.03.43	40.02.13	40.14.31	43.02.02
33.06.19	36.07.01	38.19.11	39.03.44	40.03.00	40.14.41	43.02.03
33.06.20	36.07.11	38.19.12	39.03.45	40.04.00	40.15.01	43.02.04
33.06.21	36.08.01	38.19.13	39.03.46	40.05.01	40.15.11	43.02.05
33.06.31	36.08.11	38.19.14	39.03.51	40.05.02	40.16.01	43.02.06
33.06.32	36.08.21	38.19.15	39.03.52	40.05.11	40.16.11	43.02.07
34.01.01	36.08.31	38.19.16	39.03.61	40.05.12	40.16.21	43.02.08
34.01.11	37.08.01	38.19.17	39.04.01	40.05.21	41.01.01	43.02.09
34.01.12	38.01.01	38.19.18	39.04.11	40.05.31	41.02.01	43.02.10
34.01.13	38.01.02	38.19.19	39.04.21	40.06.02	41.02.13	43.02.11
34.01.21	38.02.00	38.19.21	39.05.01	40.06.21	41.02.21	43.02.21
34.02.01	38.03.01	38.19.22	39.05.02	40.06.22	41.02.22	43.02.31
34.02.11	38.03.11	38.19.23	39.05.03	40.06.23	41.02.23	43.03.21
34.02.21	38.05.00	39.01.01	39.05.04	40.06.31	41.03.01	43.04.01
34.03.00	38.06.00	39.01.02	39.05.11	40.06.32	41.03.11	43.04.11
34.03.01	38.07.01	39.01.03	39.05.12	40.06.41	41.04.01	51.01.01
34.03.11	38.07.11	39.01.04	39.05.13	40.06.51	41.04.11	51.01.02
34.04.01	38.07.21	39.01.11	39.05.21	40.06.61	41.05.01	51.01.11
34.04.11	38.07.31	39.01.12	39.05.51	40.06.71	41.05.12	51.01.12
34.04.12	38.08.01	39.01.13	39.05.61	40.06.81	41.05.13	51.01.13
34.05.01	38.08.11	39.01.21	39.06.01	40.07.01	41.05.22	51.01.14
34.05.11	38.08.12	39.01.22	39.06.02	40.07.02	41.05.23	51.01.15
34.05.12	38.08.13	39.01.31	39.06.03	40.08.01	41.05.24	51.01.16
34.05.13	38.08.21	39.01.41	39.06.04	40.08.02	41.05.25	51.02.01
34.05.14	38.08.31	39.01.51	39.06.11	40.08.03	41.06.00	51.02.02
34.06.01	38.09.01	39.01.52	39.06.12	40.08.11	41.07.00	51.02.03
34.06.03	38.09.11	39.01.61	39.06.13	40.08.21	41.08.01	51.02.04
34.06.11	38.09.21	39.01.71	39.06.21	40.08.31	41.08.11	51.03.01
34.07.00	38.09.31	39.02.01	39.06.31	40.08.32	41.09.00	51.03.21
35.01.01	38.10.01	39.02.02	39.06.41	40.08.33	41.10.00	56.01.01
35.01.21	38.10.21	39.02.03	39.06.51	40.08.41	42.01.01	56.01.02
35.02.00	38.11.01	39.02.04	39.06.61	40.08.51	42.01.21	56.01.11
35.03.01	38.11.02	39.02.11	39.07.01	40.09.01	42.01.22	56.01.12
35.03.11	38.11.11	39.02.12	39.07.11	40.09.11	42.02.01	56.02.00
35.03.21	38.11.21	39.02.13	39.07.21	40.10.01	42.02.02	56.02.01

(Continued)

29-32 (Continued)
Leath.-Rub.-Plast.-Chem.-Petr.

56.02.02
56.03.00
56.04.01
56.04.11
56.04.21
56.05.01
56.05.11
56.06.01
66.02.11
68.08.00
87.06.14
89.01.71
94.01.02
94.03.17
94.04.11
94.05.22
96.02.05
96.02.11
98.01.24
98.01.25
98.13.11

33
Non-metallic Minerals

25.04.11
25.06.11
25.07.02
25.07.03
25.11.21
25.12.21
25.13.12
25.13.22
25.13.32
25.18.03
25.18.04
25.18.05
25.20.12
25.21.11
25.22.01
25.22.11
25.23.00
25.26.21
25.27.11
25.28.11
25.32.43
25.32.62
30.05.03
68.06.01
68.06.11
68.06.21
68.07.01
68.07.11
68.07.21
68.07.31
68.09.01
68.09.11
68.10.01
68.10.11
68.10.21
68.11.01
68.11.11
68.11.21
68.11.31
68.12.01
68.12.11
68.12.21
68.12.31
68.13.01
68.13.11
68.13.21
68.13.31
68.13.41
68.13.42
68.14.01
68.14.11
68.15.01
68.15.02
68.15.03
68.16.01
68.16.11
68.16.31
68.16.41
68.16.51
69.01.00
69.02.01
69.02.02
69.02.11
69.03.01
69.03.11
69.04.00
69.05.01
69.05.11
69.05.21
69.06.00
69.07.01
69.07.11
69.07.12
69.07.21
69.07.23
69.08.01
69.08.11
69.08.12
69.08.13
69.08.14
69.08.21
69.08.22
69.08.23
69.08.24
69.08.25
69.09.01
69.09.13
69.09.14
69.10.01
69.10.11
69.10.21
69.10.22
69.10.31
69.10.32
69.11.01
69.11.11
69.11.21
69.12.01
69.12.11
69.12.12
69.12.13
69.12.21
69.12.22
69.12.23
69.13.01
69.13.11
69.13.21
69.13.22
69.13.23
69.14.02
69.14.03
69.14.11
69.14.21
69.14.22
69.14.23
69.14.24
70.01.01
70.03.01
70.03.11
70.03.12
70.03.13
70.04.12
70.05.01
70.05.11
70.06.01
70.06.11
70.06.12
70.06.13
70.07.01
70.07.11
70.07.21
70.07.22
70.07.23
70.07.31
70.07.41
70.08.01
70.08.11
70.09.01
70.09.02
70.09.11
70.09.12
70.09.21
70.10.01
70.10.02
70.10.03
70.10.04
70.10.11
70.11.01
70.11.11
70.11.21
70.12.00
70.13.01
70.13.02
70.13.03
70.13.11
70.13.12
70.13.13
70.13.14
70.13.21
70.13.31
70.14.01
70.14.02
70.14.11
70.14.12
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70.14.14
70.14.21
70.15.01
70.15.02
70.15.03
70.15.04
70.15.11
70.16.01
70.16.02
70.16.03
70.16.11
70.17.01
70.17.11
70.17.21
70.18.00
70.19.01
70.19.11
70.19.21
70.19.31
70.19.41
70.20.01
70.20.11
70.20.12
70.21.01
70.21.11
70.21.21
85.19.10
85.19.12
85.24.21
85.25.01
85.26.11
85.26.21
95.07.11
95.08.11
98.01.21
98.06.00

29-32 (Continued)
Leath.-Rub.-Plast.-Chem.-Petr.

56.02.02
56.03.00
56.04.01
56.04.11
56.04.21
56.05.01
56.05.11
56.06.01
66.02.11
68.03.00
87.06.14
89 01.71
94.01.02
94.03.17
94.04.11
94.05.22
96.02.05
96.02.11
98.01.24
98.01.25
98.13.11

33
Non-metallic Minerals

25.04.11
25.06.11
25.07.02
25.07.03
25.11.21
25.12.21
25.13.12
25.13.22
25.13.32
25.18.03
25.18.04
25.18.05
25.20.12
25.21.11
25.22.01
25.22.11
25.23.00
25.26.21
25.27.11
25.28.11
25.32.43
25.32.62
30.05.03
68.06.01
68.06.11
68.06.21
68.07.01
68.07.11
68.07.21
68.07.31
68.09.01
68.09.11
68.10.01
68.10.11
68.10.21
68.11.01
68.11.11
68.11.21
68.11.31
68.12.01
68.12.11
68.12.21
68.12.31
68.13.01
68.13.11
68.13.21
68.13.31
68.13.41
68.13.42
68.14.01
68.14.11
68.15.01
68.15.02
68.15.03
68.16.01
68.16.11
68.16.31
68.16.41
68.16.51
69.01.00
69.02.01
69.02.02
69.02.11
69.03.01
69.03.11
69.04.00
69.05.01
69.05.11
69.05.21
69.06.00
69.07.01
69.07.11
69.07.12
69.07.21
69.07.23
69.08.01
69.08.11
69.08.12
69.08.13
69.08.14
69.08.21
69.08.22
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69.08.24
69.08.25
69.09.01
69.09.13
69.09.14
69.10.01
69.10.11
69.10.21
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69.10.31
69.10.32
69.11.01
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69.12.01
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69.12.21
69.12.22
69.12.23
69.13.01
69.13.11
69.13.21
69.13.22
69.13.23
69.14.02
69.14.03
69.14.11
69.14.21
69.14.22
69.14.23
69.14.24
70.01.01
70.03.01
70.03.11
70.03.12
70.03.13
70.04.12
70.05.01
70.05.11
70.06.01
70.06.11
70.06.12
70.06.13
70.07.01
70.07.11
70.07.21
70.07.22
70.07.23
70.07.31
70.07.41
70.08.01
70.08.11
70.09.01
70.09.02
70.09.11
70.09.12
70.09.21
70.10.01
70.10.02
70.10.03
70.10.04
70.10.11
70.11.01
70.11.11
70.11.21
70.12.00
70.13.01
70.13.02
70.13.03
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70.15.04
70.15.11
70.16.01
70.16.02
70.16.03
70.16.11
70.17.01
70.17.11
70.17.21
70.18.00
70.19.01
70.19.11
70.19.21
70.19.31
70.19.41
70.20.01
70.20.11
70.20.12
70.21.01
70.21.11
70.21.21
85.19.10
85.19.12
85.24.21
85.25.01
85.26.11
85.26.21
95.07.11
95.08.11
98.01.21
98.06.00

34

Basic Metal Industries

71.05.01	74.04.11	81.04.21
71.05.11	74.05.01	81.04.23
71.05.21	74.05.11	81.04.24
71.05.31	74.05.12	83.15.01
71.07.21	74.06.00	83.15.11
71.09.01	75.01.11	
71.09.11	75.01.21	
73.01.01	75.02.11	
73.01.11	75.02.12	
73.02.00	75.03.11	
73.02.01	75.03.21	
73.02.09	76.01.00	
73.03.00	76.01.01	
73.04.00	76.02.11	
73.05.01	76.02.12	
73.06.01	76.03.01	
73.07.01	76.03.11	
73.07.02	76.04.01	
73.07.11	76.04.11	
73.07.21	76.04.12	
73.09.01	76.05.00	
73.09.11	77.01.01	
73.10.01	77.02.01	
73.10.02	77.02.21	
73.10.03	78.01.01	
73.10.04	78.01.02	
73.10.05	78.02.11	
73.10.06	78.02.12	
73.11.01	78.02.12	
73.11.02	78.02.13	
73.11.03	78.03.01	
73.12.21	78.04.03	
73.12.22	79.01.00	
73.13.01	79.01.01	
73.13.02	79.02.11	
73.13.11	79.02.21	
73.13.21	79.03.01	
73.13.31	79.03.02	
73.13.32	79.03.03	
73.13.33	79.03.11	
73.13.34	79.03.21	
73.13.41	80.01.00	
73.13.42	80.01.01	
73.15.01	80.02.11	
73.15.11	80.03.01	
73.15.12	80.04.01	
74.01.21	80.04.02	
74.01.31	80.04.11	
74.02.01	81.01.21	
74.02.11	81.02.21	
74.03.11	81.04.11	
74.03.12	81.04.12	
74.04.01	81.04.13	

35-37

Metal Products - Machinery - Electr. Equipment

66.03.05	73.25.02	73.35.04	73.40.61
66.03.06	73.25.11	73.35.11	73.40.62
66.03.11	73.26.01	73.35.12	73.40.63
66.03.21	73.26.11	73.35.13	74.07.00
71.13.01	73.27.01	73.36.01	74.08.00
71.13.04	73.27.02	73.36.11	74.09.00
71.13.11	73.27.11	73.36.21	74.10.01
71.13.12	73.28.00	73.36.31	74.10.11
71.13.15	73.29.01	73.36.41	74.11.01
71.13.21	73.29.02	73.36.42	74.11.11
71.13.22	73.29.03	73.37.00	74.11.12
71.13.24	73.29.04	73.38.01	74.13.01
71.13.25	73.29.05	73.38.02	74.13.02
71.14.01	73.29.11	73.38.03	74.13.11
71.14.11	73.29.21	73.38.04	74.14.01
73.11.11	73.29.31	73.38.05	74.14.11
73.12.01	73.30.00	73.38.11	74.15.01
73.12.11	73.31.01	73.38.12	74.15.02
73.14.01	73.31.11	73.38.13	74.15.03
73.14.11	73.31.12	73.38.21	74.15.11
73.14.12	73.31.21	73.38.22	74.15.12
73.14.21	73.31.22	73.38.23	74.15.13
73.14.31	73.31.31	73.38.31	74.15.21
73.15.21	73.31.41	73.38.32	74.15.31
73.16.01	73.31.51	73.38.33	74.15.41
73.16.11	73.31.61	73.38.34	74.16.01
73.16.21	73.31.62	73.38.41	74.16.12
73.17.01	73.31.63	73.39.00	74.17.00
73.17.11	73.31.64	73.40.01	74.17.01
73.18.01	73.31.71	73.40.02	74.17.11
73.18.11	73.32.01	73.40.03	74.18.01
73.18.12	73.32.02	73.40.11	74.18.11
73.18.13	73.32.03	73.40.12	74.18.21
73.18.14	73.32.04	73.40.21	74.18.31
73.18.21	73.32.11	73.40.22	74.19.01
73.19.00	73.32.12	73.40.23	74.19.02
73.20.00	73.32.13	73.40.24	74.19.11
73.21.01	73.32.21	73.40.26	74.19.21
73.21.02	73.32.22	73.40.27	74.19.22
73.21.03	73.32.31	73.40.32	74.19.31
73.21.04	73.32.32	73.40.33	74.19.32
73.21.07	73.32.41	73.40.34	74.19.33
73.21.11	73.32.51	73.40.35	74.19.41
73.22.01	73.32.61	73.40.36	75.02.01
73.22.11	73.33.01	73.40.37	75.02.02
73.22.00	73.33.02	73.40.38	75.03.12
73.22.01	73.33.11	73.40.39	75.03.21
73.22.02	73.34.01	73.40.40	75.04.00
73.22.05	73.34.11	73.40.41	75.05.01
73.22.06	73.34.31	73.40.43	75.05.11
73.24.01	73.35.01	73.40.51	75.06.01
73.24.11	73.35.02	73.40.52	75.06.21
73.25.01	73.35.03	73.40.53	75.06.31

(Continued)

35-37 (Continued)

Metal Products - Machinery - Electr. Equipment

75.06.51	78.06.51	82.09.02	83.02.02	84.05.01	84.15.03	84.22.01
75.06.52	79.02.01	82.09.03	83.02.03	84.05.11	84.15.04	84.22.11
75.06.53	79.05.00	82.09.04	83.02.05	84.05.21	84.15.05	84.22.21
75.06.61	79.06.51	82.09.05	83.02.11	84.06.01	84.15.11	84.22.22
75.06.71	79.06.71	82.09.06	83.02.21	84.06.02	84.15.12	84.22.23
76.02.01	80.02.01	82.09.07	83.02.31	84.06.03	84.15.13	84.22.24
76.06.00	80.06.11	82.09.08	83.02.41	84.06.11	84.15.21	84.22.31
76.07.00	80.06.31	82.09.09	83.03.01	84.06.12	84.16.03	84.22.32
76.08.01	80.06.32	82.09.10	83.03.11	84.06.13	84.16.11	84.22.33
76.08.11	80.06.41	82.09.11	83.03.21	84.06.14	84.17.01	84.22.34
76.08.21	81.01.11	82.09.12	83.04.00	84.06.21	84.17.11	84.22.41
76.09.00	81.01.12	82.09.21	83.05.01	84.06.22	84.17.12	84.23.01
76.10.01	81.02.11	82.09.22	83.05.11	84.06.23	84.17.13	84.23.01
76.10.11	81.02.12	82.09.23	83.05.21	84.06.31	84.17.21	84.23.02
76.10.13	81.02.41	82.09.31	83.06.00	84.07.01	84.17.22	84.23.03
76.10.21	81.04.06	82.09.32	83.07.01	84.07.11	84.17.23	84.23.04
76.10.22	81.04.16	82.09.33	83.07.02	84.08.01	84.17.31	84.23.05
76.11.00	81.04.22	82.10.00	83.07.11	84.08.11	84.17.41	84.23.06
76.12.01	81.04.25	82.11.01	83.07.12	84.08.31	84.17.51	84.23.11
76.12.11	81.04.26	82.11.02	83.07.13	84.08.31	84.18.01	84.23.21
76.13.11	82.01.01	82.11.11	83.07.14	84.09.01	84.18.01	84.23.31
76.14.00	82.01.11	82.11.12	83.07.21	84.09.11	84.18.03	84.24.01
76.15.01	82.01.21	82.11.13	83.07.31	84.10.01	84.18.04	84.24.02
76.15.11	82.01.31	82.12.01	83.07.41	84.10.02	84.18.05	84.24.03
76.15.21	82.01.41	82.12.11	83.07.42	84.10.03	84.18.11	84.24.04
76.15.31	82.01.51	82.12.21	83.07.43	84.10.04	84.18.12	84.24.05
76.15.41	82.02.01	82.13.01	83.07.44	84.10.05	84.18.21	84.24.11
76.16.01	82.02.02	82.13.11	83.08.00	84.10.06	84.18.22	84.24.13
76.16.11	82.02.11	82.13.21	83.09.01	84.10.07	84.18.01	84.24.15
76.16.21	82.02.12	82.13.31	83.09.11	84.10.08	84.19.11	84.24.21
76.16.22	82.02.13	82.13.41	83.10.00	84.10.12	84.19.21	84.24.22
76.16.23	82.02.14	82.13.42	83.11.00	84.10.21	84.19.31	84.24.31
76.16.32	82.02.15	82.13.51	83.12.01	84.11.01	84.19.32	84.24.32
76.16.33	82.02.16	82.14.01	83.12.11	84.11.11	84.19.41	84.25.01
76.16.34	82.02.21	82.14.02	83.13.01	84.11.12	84.20.01	84.25.02
76.16.35	82.03.01	82.14.03	83.13.02	84.11.13	84.20.11	84.25.03
76.16.36	82.03.11	82.14.11	83.13.03	84.11.21	84.20.12	84.25.04
76.16.37	82.03.21	82.14.12	83.13.11	84.11.22	84.20.13	84.25.06
76.16.38	82.04.01	82.14.21	83.14.00	84.11.23	84.20.14	84.25.07
76.16.39	82.04.02	82.14.22	84.01.01	84.11.24	84.20.21	84.25.08
76.16.41	82.04.03	82.14.23	84.01.02	84.11.31	84.20.31	84.25.09
76.16.42	82.04.04	82.14.31	84.01.03	84.12.01	84.20.32	84.25.11
76.16.51	82.04.11	82.14.41	84.01.11	84.12.02	84.20.33	84.25.12
76.16.61	82.04.21	82.14.42	84.02.01	84.12.11	84.21.01	84.25.13
77.02.01	82.04.31	82.15.00	84.02.11	84.13.01	84.21.11	84.25.21
77.03.00	82.04.41	83.01.01	84.02.21	84.13.02	84.21.12	84.25.22
78.02.01	82.05.00	83.01.02	84.03.01	84.13.03	84.21.13	84.25.31
78.05.01	82.06.01	83.01.03	84.03.02	84.13.11	84.21.14	84.25.41
78.05.11	82.06.11	83.01.11	84.03.03	84.13.21	84.21.15	84.25.51
78.06.02	82.07.00	83.01.12	84.03.11	84.14.01	84.21.21	84.26.01
78.06.11	82.08.01	83.01.13	84.04.02	84.14.11	84.21.31	84.26.11
78.06.12	82.08.11	83.01.21	84.04.11	84.15.01	84.21.41	84.27.01
78.06.41	82.09.01	83.02.01	84.04.12	84.15.02	84.21.51	84.27.02

(Continued)

35-37 (Continued)

Metal Products - Machinery - Electr. Equipment

84.27.03	84.39.11	84.54.51	85.04.01	85.12.38	85.20.06	93.07.41
84.27.12	84.39.21	84.55.00	85.04.11	85.12.41	85.20.11	93.07.51
84.27.13	84.40.01	84.56.01	85.04.12	85.12.42	85.20.21	93.07.61
84.27.21	84.40.02	84.56.11	85.05.00	85.12.43	85.20.31	94.01.31
84.28.01	84.40.03	84.56.21	85.06.01	85.12.44	85.20.32	94.01.41
84.28.02	84.40.04	84.57.01	85.06.11	85.12.45	85.21.00	94.03.15
84.28.03	84.40.05	84.57.11	85.06.12	85.12.46	85.22.01	94.03.16
84.28.04	84.40.11	84.58.00	85.06.13	85.12.47	85.22.11	94.04.01
84.28.11	84.40.12	84.59.01	85.06.21	85.12.48	85.22.21	94.04.02
84.28.12	84.40.13	84.59.02	85.06.31	85.12.49	85.22.31	96.02.06
84.28.21	84.40.14	84.59.03	85.06.41	85.12.50	85.23.01	96.02.07
84.28.22	84.40.15	84.59.04	85.06.42	85.12.61	85.23.02	97.07.01
84.29.01	84.40.21	84.59.11	85.06.43	85.12.71	85.23.03	97.08.00
84.29.12	84.40.22	84.59.21	85.06.44	85.13.01	85.23.04	98.01.01
84.29.13	84.40.23	84.59.31	85.06.45	85.13.11	85.23.05	98.01.02
84.29.21	84.40.31	84.59.32	85.06.51	85.14.01	85.23.06	98.01.03
84.30.01	84.40.32	84.59.33	85.06.52	85.14.11	85.23.11	98.02.00
84.30.02	84.40.33	84.59.34	85.06.53	85.14.12	85.24.01	98.07.02
84.30.03	84.40.41	84.59.41	85.06.54	85.14.21	85.24.11	98.07.11
84.30.11	84.40.51	84.60.00	85.06.55	85.15.01	85.24.21	98.10.01
84.30.12	84.41.01	84.61.01	85.06.61	85.15.11	85.24.31	98.10.02
84.30.13	84.41.02	84.61.11	85.07.00	85.15.12	85.25.01	98.10.03
84.30.14	84.41.11	84.61.21	85.07.01	85.15.13	85.25.11	98.10.04
84.30.21	84.41.21	84.61.31	85.07.02	85.15.21	85.26.01	98.12.01
84.30.31	84.41.31	84.61.32	85.07.11	85.15.22	85.26.11	98.12.11
84.30.41	84.41.32	84.61.33	85.08.01	85.15.23	85.26.21	98.13.01
84.30.51	84.42.01	84.61.41	85.08.02	85.15.31	85.27.01	98.14.00
84.31.01	84.42.11	84.62.00	85.08.11	85.15.41	85.27.11	98.15.00
84.31.11	84.43.01	84.63.00	85.09.00	85.16.00	85.28.00	98.16.11
84.32.01	84.43.11	84.64.00	85.10.00	85.17.00	92.11.01	
84.32.11	84.44.01	84.65.01	85.11.01	85.18.01	92.11.02	
84.33.01	84.44.11	84.65.11	85.11.02	85.18.11	92.11.11	
84.33.11	84.45.01	85.01.01	85.11.03	85.19.01	92.11.12	
84.34.01	84.45.11	85.01.02	85.11.11	85.19.02	92.11.13	
84.34.11	84.45.21	85.01.11	85.11.12	85.19.03	92.13.11	
84.34.21	84.46.00	85.01.12	85.11.21	85.19.04	93.01.01	
84.34.31	84.47.01	85.01.13	85.12.01	85.19.05	93.01.11	
84.34.41	84.47.11	85.01.14	85.12.02	85.19.06	93.01.21	
84.34.51	84.47.21	85.01.21	85.12.03	85.19.07	93.02.01	
84.35.01	84.48.00	85.01.22	85.12.04	85.19.08	93.02.11	
84.35.11	84.49.00	85.01.31	85.12.05	85.19.09	93.04.01	
84.35.21	84.50.01	85.01.32	85.12.06	85.19.11	93.04.11	
84.35.31	84.50.02	85.01.33	85.12.07	85.19.21	93.04.21	
84.36.00	84.50.11	85.01.41	85.12.08	85.19.31	93.04.22	
84.37.00	84.51.01	85.01.42	85.12.11	85.19.41	93.05.00	
84.38.01	84.51.11	85.01.43	85.12.21	85.19.51	93.06.01	
84.38.11	84.52.00	85.01.51	85.12.31	85.19.52	93.06.11	
84.38.12	84.53.00	85.02.01	85.12.32	85.19.53	93.07.02	
84.38.13	84.54.01	85.02.11	85.12.33	85.20.01	93.07.03	
84.38.14	84.54.11	85.02.21	85.12.34	85.20.02	93.07.04	
84.38.15	84.54.21	85.02.31	85.12.35	85.20.03	93.07.05	
84.38.16	84.54.31	85.02.41	85.12.36	85.20.04	93.07.34	
84.39.01	84.54.41	85.03.00	85.12.37	85.20.05	93.07.35	

38 Transport Equipment

86.01.00	87.12.02
86.02.00	87.12.11
86.03.00	87.13.00
86.04.00	87.14.01
86.05.00	87.14.11
86.06.00	87.14.12
86.07.00	87.14.13
86.08.00	87.14.21
86.09.00	88.02.01
86.10.00	88.02.11
87.01.01	88.02.21
87.01.11	88.02.41
87.01.21	88.03.00
87.02.01	88.04.00
87.02.02	88.05.00
87.02.03	89.01.01
87.02.04	89.01.02
87.02.05	89.01.03
87.02.06	89.01.11
87.02.07	89.01.21
87.02.08	89.01.31
87.02.09	89.01.32
87.02.10	89.01.34
87.02.11	89.01.41
87.02.12	89.01.51
87.02.13	89.01.52
87.02.21	89.02.00
87.02.22	89.03.00
87.03.00	89.03.11
87.04.11	89.04.00
87.04.12	89.05.01
87.05.01	89.05.21
87.05.11	89.05.41
87.05.21	
87.05.31	
87.05.32	
87.05.41	
87.06.01	
87.06.02	
87.06.11	
87.06.12	
87.06.13	
87.06.15	
87.07.01	
87.07.11	
87.09.01	
87.09.02	
87.09.03	
87.09.11	
87.09.21	
87.10.00	
87.11.01	
87.11.11	
87.12.01	

39 Miscellaneous Industries

37.01.01	90.13.11	90.28.01	92.12.14
37.01.11	90.13.21	90.28.11	92.12.15
37.01.12	90.13.31	90.28.21	92.12.21
37.02.01	90.13.51	90.29.00	95.02.11
37.02.11	90.13.61	91.01.01	95.02.12
37.03.01	90.14.01	91.01.11	95.03.11
37.03.11	90.14.02	91.01.21	95.03.12
37.04.01	90.14.03	91.01.31	95.05.02
37.04.11	90.14.04	91.01.41	95.05.12
37.05.01	90.14.05	91.01.51	95.08.21
37.05.11	90.14.06	91.02.01	97.01.00
37.06.00	90.14.07	91.02.11	97.02.01
37.07.00	90.15.00	91.03.00	97.02.11
71.03.00	90.16.01	91.04.01	97.02.21
71.04.00	90.16.11	91.04.02	97.03.01
71.12.01	90.17.01	91.04.11	97.03.11
71.12.11	90.17.11	91.05.00	97.03.21
71.12.21	90.17.21	91.06.00	97.04.01
71.12.31	90.18.01	91.07.01	97.04.12
71.16.01	90.18.02	91.07.11	97.04.15
71.16.02	90.18.03	91.08.02	97.04.31
71.16.11	90.19.01	91.08.11	97.04.32
71.16.12	90.19.11	91.09.01	97.05.11
71.16.13	90.19.12	91.09.11	97.05.21
71.16.14	90.19.13	91.09.21	97.05.31
71.16.15	90.19.14	91.10.00	97.06.00
90.01.01	90.19.21	91.11.01	98.01.11
90.01.11	90.19.31	91.11.11	98.01.12
90.01.21	90.20.01	92.01.01	98.01.23
90.02.00	90.20.02	92.01.02	98.03.01
90.03.01	90.20.03	92.01.03	98.03.11
90.03.11	90.20.04	92.01.11	98.03.21
90.03.21	90.21.00	92.02.01	98.03.31
90.03.31	90.22.00	92.02.11	98.04.01
90.04.01	90.23.01	92.03.00	98.04.11
90.04.02	90.23.11	92.04.01	98.05.01
90.04.03	90.23.21	92.04.11	98.05.11
90.04.04	90.23.31	92.04.12	98.05.21
90.04.11	90.24.01	92.05.00	98.05.31
90.04.12	90.24.02	92.06.00	
90.05.00	90.24.03	92.07.00	
90.06.01	90.24.04	92.08.01	
90.06.11	90.24.05	92.08.02	
90.07.01	90.25.01	92.08.03	
90.07.11	90.25.02	92.08.11	
90.08.01	90.25.03	92.09.00	
90.08.02	90.25.04	92.10.01	
90.08.11	90.25.05	92.10.02	
90.09.00	90.26.01	92.10.21	
90.10.00	90.26.11	92.10.31	
90.11.00	90.26.12	92.12.01	
90.12.01	90.26.13	92.12.11	
90.12.11	90.27.01	92.12.12	
90.13.01	90.27.11	92.12.13	

EXPORTS : Years 1960, 1965, 1966.
By Statistical Code Number of the National Statistical Service of Greece:
Ref.: N:5 External Trade - Foreign Trade of Greece.

20-22 Food-Drink-Tobacco			23 Textiles			24 Clothing-Footwear
04.03.01	18.06.21	22.10.01	50.04.01	55.09.12	59.05.14	40.13.02
04.04.11	18.06.31	22.10.02	50.04.11	55.09.16	59.14.01	40.13.12
04.04.12	19.02.02	23.04.11	50.06.01	55.09.18	59.14.02	42.03.21
04.04.13	19.03.00	23.05.00	50.07.01	55.09.24	59.17.05	42.03.22
04.04.14	19.06.00	24.02.01	50.09.13	55.09.41	59.17.11	42.03.31
04.04.20	19.08.01	24.02.02	51.04.01	55.09.42	60.01.21	42.05.11
07.02.11	19.08.21		51.04.02	55.09.43	60.01.22	43.03.01
07.03.11	20.01.11		51.04.03	55.09.44	60.01.31	43.03.11
07.04.00	20.01.21		53.01.11	55.09.45	60.01.32	60.02.01
09.01.11	20.01.23		53.02.02	55.09.46	60.01.33	60.02.04
11.01.01	20.02.01		53.06.01	55.09.50	60.01.41	60.03.11
11.02.01	20.02.11		53.06.02	55.09.52	60.06.01	60.03.21
11.02.02	20.02.21		53.06.11	56.07.02	60.06.12	60.04.02
12.02.00	20.02.32		53.06.12	56.07.11	62.01.11	60.04.11
12.08.02	20.05.01		53.06.22	57.07.01	62.01.21	60.04.12
15.07.01	20.05.11		53.07.02	57.07.02	62.02.01	60.04.31
15.07.11	20.06.01		53.07.11	57.07.11	62.02.04	60.05.01
15.07.31	20.06.02		53.07.12	58.01.11	62.02.05	60.05.02
15.07.41	20.06.21		53.07.13	58.01.21	62.02.13	60.05.04
15.13.01	20.07.01		53.07.14	58.01.41	62.02.16	60.05.05
15.13.02	20.07.02		53.11.01	58.02.02	62.03.01	60.05.06
16.01.01	20.07.11		53.11.02	58.02.03	62.03.11	60.05.11
16.01.11	20.07.12		53.11.03	58.02.04	62.04.01	60.05.14
16.01.31	20.07.13		53.11.04	58.02.05	62.04.21	60.05.15
16.02.21	20.07.21		53.11.08	58.02.07	62.04.31	60.05.23
16.04.01	21.01.01		53.11.09	58.02.09	62.05.11	60.05.24
16.04.02	21.02.01		53.11.10	58.02.11	62.05.41	60.05.25
16.04.03	21.06.01		53.11.21	58.02.12	63.02.00	60.06.11
16.04.04	21.07.01		55.01.11	58.03.00	67.02.01	61.01.02
16.04.05	21.07.11		55.01.12	58.04.11	67.02.21	61.01.03
16.04.11	21.07.21		55.02.00	58.04.22	94.04.12	61.01.04
16.04.23	22.01.21		55.05.01	58.04.31	94.04.21	61.01.05
16.04.24	22.02.00		55.05.02	58.06.00		61.01.06
16.05.12	22.03.01		55.05.03	58.07.24		61.01.21
16.05.21	22.04.00		55.05.06	58.07.27		61.02.01
16.05.22	22.05.02		55.05.07	58.08.21		61.02.03
17.02.04	22.05.11		55.05.10	58.08.41		61.02.04
17.02.31	22.05.12		55.05.11	58.08.42		61.02.05
17.04.02	22.05.13		55.05.31	58.09.04		61.03.21
17.04.03	22.05.14		55.05.33	58.09.08		61.03.31
17.04.04	22.06.02		55.06.02	58.09.24		61.04.21
17.04.05	22.06.11		55.06.21	58.10.41		61.04.31
17.04.06	22.06.12		55.07.01	59.01.11		61.04.32
17.04.07	22.09.02		55.07.02	59.02.03		61.06.21
17.05.01	22.09.11		55.09.01	59.04.05		61.06.41
18.04.00	22.09.12		55.09.02	59.04.15		61.09.11
18.05.00	22.09.21		55.09.06	59.05.02		61.09.21
18.06.11	22.09.25		55.09.08	59.05.12		61.10.00

(Continued)

24 Clothing-Footwear	25-26 Wood-Cork-Furniture	27-28 Paper-Printing	29-32 Leather-Rubber-Plastics-Chemicals-Petrol	
61.11.11	44.05.02	48.01.01	12.07.25	29.44.12
64.01.02	44.05.07	48.01.13	15.07.42	30.02.11
64.01.11	44.14.00	48.01.71	15.07.45	30.03.11
64.02.01	44.20.01	48.01.85	15.12.02	30.03.21
64.02.02	44.20.02	48.09.11	15.12.12	30.03.25
64.02.03	44.20.11	48.09.12	22.08.01	30.03.27
64.02.04	44.20.12	48.15.11	22.09.01	30.03.51
64.02.13	44.21.01	48.16.01	27.10.01	30.03.61
65.04.01	44.22.01	48.16.21	27.10.02	30.03.63
65.05.01	44.23.12	48.18.61	27.10.11	30.03.71
65.05.21	44.24.00	48.18.71	27.10.32	30.03.81
65.05.41	44.25.41	48.19.00	27.10.35	31.02.04
65.05.43	44.27.11	48.20.01	27.10.41	31.03.04
65.05.61	44.27.21	48.21.51	27.10.51	31.03.05
	44.28.11	49.01.02	27.10.61	31.03.11
	44.28.21	49.01.11	27.10.63	31.05.01
	44.28.32	49.01.12	27.10.64	31.05.02
	45.03.41	49.02.01	27.13.12	32.01.01
	45.04.00	49.03.01	27.14.01	32.05.07
	46.02.21	49.03.11	28.01.02	32.05.41
	46.03.01	49.04.11	28.06.01	32.08.21
	46.03.21	49.05.00	28.07.01	32.09.04
	94.01.01	49.07.41	28.07.11	32.09.11
	94.01.11	49.09.01	28.08.01	32.12.00
	94.01.12	49.09.11	28.08.02	32.13.11
	94.01.13	49.10.01	28.13.01	32.13.12
	94.01.14	49.10.11	28.13.02	33.01.05
	94.01.21	49.10.12	28.16.01	33.01.08
	94.01.23	49.10.13	28.23.01	33.01.12
	94.01.24	49.11.01	28.28.21	33.04.01
	94.01.31	49.11.02	28.30.05	33.04.11
	94.03.11	49.11.12	28.31.01	33.06.03
	94.03.12	49.11.13	28.38.02	33.06.14
	94.03.13	49.11.14	28.38.03	33.06.18
	94.03.14	49.11.15	28.42.06	33.06.19
	94.03.16	49.11.78	28.45.01	33.06.20
	96.01.00	49.11.81	28.46.01	34.01.01
	96.02.03		28.56.11	34.01.12
	96.02.42		28.58.22	34.01.13
	96.04.00		29.02.51	34.01.21
	96.04.14		29.04.31	34.02.01
	97.04.14		29.08.41	34.02.11
	97.04.21		29.14.14	34.05.11
	97.04.32		29.14.15	34.05.12
	98.11.01		29.16.03	34.05.13
	98.11.11		29.16.04	34.06.11
			29.16.07	35.03.11
			29.22.03	35.05.11
			29.25.12	35.06.00
			29.35.00	36.01.11
			29.40.01	36.02.01
			29.40.12	36.03.00
			29.42.11	36.04.01
			29.44.11	36.04.03

(Continued)

29-32 Leath.-Rub.-Plast.-Chem.-Petr.		33 Non-metallic Minerals		34 Basic Metal Industries
36.04.04	40.14.41	25.07.02	70.13.02	71.05.01
36.05.01	40.15.01	25.07.03	70.13.11	71.05.21
36.06.00	41.02.01	25.11.21	70.13.12	71.09.01
36.08.31	41.02.13	25.13.02	70.13.31	71.09.11
37.02.11	41.02.22	25.13.12	70.14.01	73.03.00
37.03.11	41.02.23	25.13.32	70.14.02	73.06.02
37.07.00	41.03.01	25.15.02	70.14.11	73.10.01
38.03.01	41.04.11	25.17.31	70.14.13	73.12.21
38.07.01	41.05.21	25.19.02	70.19.01	73.13.01
38.08.01	41.05.22	25.19.03	70.19.21	73.13.31
38.11.02	41.05.23	25.23.00	70.20.12	73.13.33
38.14.00	41.05.25	25.27.11	70.21.21	73.13.41
38.15.00	41.06.00	25.32.62		73.15.11
38.19.01	41.10.00	26.01.01		74.01.01
38.19.07	42.01.02	68.02.01		74.01.31
38.19.21	42.02.04	68.02.11		74.03.11
38.19.22	42.02.21	68.04.02		74.04.01
39.01.41	42.02.22	68.04.11		74.04.11
39.01.52	42.02.23	68.10.21		75.01.01
39.02.01	42.02.31	68.11.01		76.01.01
39.02.04	42.02.33	68.12.21		76.02.01
39.02.13	42.04.11	68.16.51		76.02.11
39.02.14	42.05.11	69.02.11		76.02.12
39.02.31	43.01.11	69.04.00		76.03.01
39.02.41	43.01.21	69.05.21		76.03.11
39.02.51	43.01.31	69.07.01		76.04.11
39.02.61	43.01.32	69.08.11		76.04.12
39.03.43	43.01.41	69.08.12		77.01.01
39.03.45	43.02.01	69.08.13		78.01.01
39.07.01	43.02.09	69.08.21		79.01.02
39.07.11	43.02.11	69.08.24		80.01.01
39.07.21	43.02.12	69.09.11		83.15.01
39.07.41	43.02.31	69.11.11		
39.07.42	43.03.21	69.11.21		
39.07.51	51.01.01	69.12.01		
39.07.71	51.01.11	69.12.11		
39.07.91	51.01.12	69.12.12		
39.07.92	51.01.14	69.12.21		
40.05.02	51.02.01	69.12.22		
40.06.51	56.01.02	69.13.21		
40.06.81	56.03.00	69.13.22		
40.08.11	56.05.01	69.13.23		
40.08.21	56.05.11	69.14.02		
40.08.32	94.01.02	69.14.03		
40.08.51	94.04.11	69.14.24		
40.09.01	95.08.21	70.05.01		
40.09.11	96.02.05	70.06.13		
40.10.11	98.01.24	70.07.41		
40.11.03		70.08.01		
40.11.04		70.09.01		
40.11.05		70.09.02		
40.11.13		70.10.01		
40.11.21		70.10.04		
40.14.31		70.13.01		

35-37

Metal Products - Machinery - Electr. Equipment

71.13.04	74.09.00	83.02.21	84.15.21	84.38.15	85.11.02
71.13.21	74.10.01	83.05.21	84.16.11	84.38.16	85.11.12
71.13.22	74.10.11	83.06.00	84.17.13	84.40.03	85.11.21
71.13.24	74.17.00	83.07.01	84.17.21	84.40.11	85.12.01
71.13.25	74.17.01	83.07.02	84.17.31	84.40.41	85.12.02
71.14.11	74.17.11	83.07.11	84.18.04	84.40.51	85.12.03
73.14.01	74.18.01	83.07.12	84.18.12	84.41.01	85.12.04
73.18.11	74.18.11	83.07.13	84.18.22	84.42.01	85.12.11
73.18.14	74.18.21	83.07.21	84.19.01	84.44.01	85.12.21
73.20.00	74.19.01	83.07.42	84.19.11	84.45.01	85.12.41
73.21.01	74.19.02	83.07.44	84.19.31	84.45.11	85.12.43
73.21.02	74.19.11	83.09.01	84.19.41	84.45.21	85.12.44
73.21.03	74.19.21	83.09.11	84.20.11	84.46.00	85.12.45
73.21.07	74.19.28	83.11.00	84.20.12	84.47.11	85.12.48
73.21.11	74.19.41	83.12.01	84.20.14	84.48.00	85.12.49
73.22.01	76.06.00	83.12.11	84.21.01	84.49.00	85.12.50
73.23.00	76.08.01	83.13.02	84.21.11	84.51.01	85.12.61
73.23.02	76.08.21	83.13.03	84.21.13	84.52.00	85.12.71
73.24.01	76.10.11	83.14.00	84.21.51	84.55.00	85.13.01
73.24.11	76.10.22	83.15.11	84.22.01	84.56.01	85.13.11
73.25.01	76.12.01	84.01.11	84.22.11	84.56.11	85.15.41
73.25.02	76.12.11	84.03.02	84.22.24	84.56.21	85.17.00
73.26.01	76.15.01	84.06.12	84.22.31	84.59.03	85.18.01
73.27.02	76.15.21	84.06.13	84.22.34	84.59.04	85.19.01
73.29.03	76.15.31	84.06.21	84.22.41	84.59.21	85.19.03
73.30.00	76.15.41	84.06.23	84.23.31	84.59.33	85.19.06
73.32.02	76.16.23	84.06.31	84.24.03	84.59.34	85.19.07
73.32.03	76.16.32	84.07.01	84.24.04	84.59.41	85.19.11
73.32.51	76.16.51	84.07.11	84.24.21	84.60.00	85.19.31
73.34.31	76.16.61	84.10.01	84.24.32	84.61.01	85.19.51
73.35.02	79.06.43	84.10.02	84.25.05	84.61.31	85.19.53
73.35.04	79.06.71	84.10.03	84.25.13	84.61.32	85.20.01
73.36.01	81.01.11	84.10.04	84.25.41	84.61.33	85.20.02
73.36.31	81.04.26	84.10.05	84.28.11	84.61.41	85.20.03
73.36.42	82.02.13	84.10.06	84.28.21	84.63.00	85.20.04
73.38.01	82.02.16	84.10.07	84.29.01	84.64.00	85.20.05
73.38.02	82.03.01	84.10.08	84.29.21	84.65.01	85.21.00
73.38.03	82.03.21	84.11.01	84.30.02	84.65.11	85.22.31
73.38.04	82.04.01	84.11.11	84.30.03	85.01.01	85.23.01
73.38.05	82.04.11	84.11.12	84.30.11	85.01.11	85.23.04
73.38.11	82.05.00	84.11.13	84.30.21	85.01.12	85.24.11
73.38.21	82.06.11	84.11.22	84.32.01	85.01.14	92.11.02
73.38.31	82.07.00	84.11.23	84.33.11	85.01.21	93.07.02
73.38.32	82.08.11	84.11.31	84.34.01	85.01.22	93.07.03
73.39.00	82.09.09	84.12.01	84.34.11	85.01.32	93.07.34
73.40.03	82.09.21	84.12.11	84.34.21	85.01.33	93.07.51
73.40.12	82.09.32	84.13.02	84.34.31	85.01.41	94.01.31
73.40.27	82.11.11	84.13.03	84.34.51	85.01.51	98.02.00
73.40.33	82.11.13	84.15.02	84.35.01	85.04.01	98.10.01
73.40.40	82.14.31	84.15.03	84.36.00	85.05.00	
73.40.51	83.01.01	84.15.04	84.37.00	85.06.11	
73.40.61	83.02.01	84.15.05	84.38.01	85.06.31	
74.03.01	83.02.02	84.15.11	84.38.11	85.06.41	
74.07.00	83.02.11	84.15.13	84.38.12	85.06.61	

38

Transport Equipment

86.09.00
87.01.01
87.01.21
87.02.03
87.02.10
87.02.11
87.02.21
87.02.22
87.03.00
87.05.31
87.06.01
87.06.11
87.06.12
87.06.13
87.06.15
87.07.11
87.12.11
87.14.12
88.02.01
88.03.00
89.01.01
89.01.02
89.01.03
89.01.31
89.01.32
89.01.51
89.02.00

Miscellaneous Industries

71.04.00
71.12.01
71.12.11
71.12.21
71.16.01
71.16.02
71.16.11
71.16.12
71.16.14
71.16.15
97.02.01
97.02.11
97.03.01
97.03.11
97.03.21
97.04.01
97.04.15
97.05.11
97.05.21
97.05.31
97.06.00
98.03.21

NOTE TO APPENDIX TO CHAPTER SIX :

Not all entries appear in every single year in the estimates.
Under the old system of classification (for the years 1953 to 1959) the entries in the tabulation denoted by sub-groupings (e.g. 55/1 , 1494/3 , etc.) are given for the earlier entrances (1953, 1954) with Greek alphabet letters rather than figures (e.g. 55/α , 1494/γ , etc.). Numerals were substituted in such cases for consistency with later practice.
Allocation of imports deriving inputs of two separate sectors for their manufacture was made on the basis of economically more important contribution according to existing evidence. Such cases were an insignificant fraction of the total.

CHAPTER SEVEN

Indirect Effects of Foreign Investment : The Linkage Effects of Sensitivity, Power, and Variability of Dispersion, in Relation to Import Substitution Policies in "Key" Industries

One important criterion in considering the effects of import substitution is whether it has occured in such industries which have the highest repercussions on the rest of the economy, in other words whether the import substitution has occured in "key" industries. To look at this criterion a measure of such repercussions has to be developed which would further define and amplify the "key" industry notion in the context of foreign investments in Greece.

One way of measuring those repercussions is to make use of the existing 1960 input-output table of the Greek economy.(1) This is the only existing official input-output table and is conveniently placed in the middle of the period we examine. One further input-output table, had there been one available, would undoubtedly have given us some basis in calculating changes in the input-output structure over time. Unfortunately we shall have to confine this analysis to the evidence presented in the lone 1960 table.

The table gives a 50 x 50 sectoral breakdown. Manufacturing industry alone accounted for thirty-one sectors. For my purposes I aggregated the entries for the manufacturing industry in eleven sectors, the ones employed in my previous analysis deriving from the National Accounts breakdown, and I grouped together the rest of the economy in five additional sectors : 1. Agriculture (including industrial crops, wheat and other cereals, fruit trees, olive groves, vineyards, vegetables, livestock, forestry-hunting, and fishing). 2. Mining-Quarrying. 3. Construction. 4. Trade. 5. Services (including electricity, gas-water, banking-insurance, commu-

(1) A. Koutsoyianni and A. Ganas : Input-Output Table of the Greek Economy (Year 1960), Center of Planning and Economic Research, Athens, 1967.

nications, transportation-storage, housing, and other services). The table therefore I have constructed for use in this chapter is a 16 x 16 aggregation of the original tables found in the Input-Output Appendix. From those grouped entries in the 16 x 16 format I obtained the matrix of coefficients, and I then derived the Leontief transposed inverse. This I present in Table XXIV .

The next step was to compute indexes of forward-linkage effects (sensitivity of dispersion) and backward-linkage effects (power of dispersion).(1) If we consider that the sum of the column elements of the transposed inverse matrix can be interpreted as the total increase in output from the whole complex of industries which would have to contribute for a unit increase in the final demand for the products of a certain industry, and that the sum of the row elements is the increase in output of that certain industry required for a unit increase in final demand for the product of each industry, then we set

$$\sum_{i=1}^{m} Z_{ij} = Z_{.j} \qquad \text{and}$$

$$\sum_{j=1}^{m} Z_{ij} = Z_{i.}$$

The set of averages $\frac{1}{m} Z_{.j}$ $(j = 1,2,\ldots,m)$ can be seen as an estimate of direct and indirect increases in output to be supplied by any random industry if final demand for the products of the jth industry $(j = 1,2,\ldots,m)$ increases by one unit, and the set of averages $\frac{1}{m} Z_{i.}$ $(i = 1,2,\ldots,m)$ similarly can be seen as an estimate of the increase in output of industry i with an increase for the products of a random industry by one unit. To normalise the averages for interindustry comparisons we relate them to the overall average. This equals

(1) In the exposition and the formulas I employ I follow P. Nørregaard Rasmussen : Studies in Intersectoral Relations. Einar Harcks Forlag, København and North-Holland Publishing Co., Amsterdam - London, 1957, pp. 133-35.

$$\frac{1}{m^2}\sum_{j=1}^{m}\sum_{i=1}^{m} Z_{ij} = \frac{1}{m^2}\sum_{j=1}^{m} Z_{.j} = \frac{1}{m^2}\sum_{i=1}^{m} Z_{i.}$$

The indices we obtain are unweighted averages and the formulas for their derivation are given as follows :

$$U_{.j} = \frac{\frac{1}{m} Z_{.j}}{\frac{1}{m^2}\sum_{j=1}^{m} Z_{.j}} \qquad (j = 1,2,\ldots,m) \qquad \text{and}$$

$$U_{i.} = \frac{\frac{1}{m} Z_{i.}}{\frac{1}{m^2}\sum_{i=1}^{m} Z_{i.}} \qquad (i = 1,2,\ldots,m).$$

U_j indicates the extent of the expansion induced by industry j in the economy as a whole, and U_i the extent to which industry i is affected by an expansion of the economy at large.(1) The indications of the repercussion coefficients are assumed not to be substantially weakened by leakages through increased imports.

From the transposed inverse of the economy I present in Table XXIV , I now derive the U_j and U_i indexes. The backward linkages are generally thought to be more important than the forward linkages in a developing economy like Greece, since "...forward linkages could never occur in pure form. (They) must always be accompanied by backward linkages, which is the result of the 'pressure of demand'. In other words, the existence or anticipation of demand is a condition for forward linkage effects to manifest themselves".(2) The linkage effects are found in Table XXV.

It may nevertheless occur that an industry with a high index of power of dispersion may have an increase in the final demand for its products but that this change will leave practically unchanged the demand for the products of a number of industries,

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(1) U_j is then the backward and U_i the forward linkage effect.

(2) A.O. Hirschman : The Strategy of Economic Development, Yale University Press, New Haven, Conn., 1958, pp. 116-17. Also see W. Baer and I. Kerstenetzky: "Import Substitution and Industrialization in Brasil", A.E.R., May 1964, 54, p. 411 ff.

from which the industry in question draws little or nothing, because it draws heavily on one only or a few of the industries. Therefore the index of power of dispersion is an "average" and as a result not necessarily always accurate on its own. The same may occur with the index of sensitivity of dispersion when only one or very few large industries depend on the industry considered but they do so to a very great extent. To meet such objections a measure of "variability" is introduced by Rasmussen in the form of parameters of the distribution of Z_{ij} for given $j = 1,2,\ldots,m$ and for given $i = 1,2,\ldots,m$, showing to what extent industry j draws evenly or one-sidedly on the complex of industries, or how evenly the complex of industries draws on industry i. A relatively high value of the $U._j$ index for one industry indicates that the industry draws heavily from the whole complex of industries, but this measure alone is not enough to substantiate a high $U._j$ sector as a potential import substituting sector. High values of variation coefficient V identify import-substitute sectors that supply relatively unevenly throughout the industry range, or demand relatively unevenly from one another. With uneven sectoral relationships an expansion in the industry concerned would not lead to an increase of a general nature involving all or most other industries. In the same way, high values of $U_{i.}$ index for a certain industry i indicate that this industry in general relative to the system of industries increases its output more for a given increase in demand than other industries and therefore in this case the system draws more upon this industry i than on others. But this again has to be accompanied by low V values, since otherwise it is not the whole system that draws on industry i but some part of the system only.(1)

We have seen that high values of U indicate that a key sector is in question, which demands (or supplies) a large share of its material inputs from (or to) all import substitute sectors compared to other sectors. A low V indicates that the demanding (or supplying) is done in an even way, so that all sectors are affected in

(1) P. Nørregaard Rasmussen : Op.cit., pp. 137-38.

an equable uniform manner.[1] In considering accordingly whether a degree of import substitution has occured in a "key" industry,[2] we have to set the import substitution coefficients against not simply the U values but against the V values as well.

The indices $V_{\cdot j}$ and $V_{i \cdot}$ can be arrived at following the Rasmussen format :

$$V_{\cdot j} = \frac{\sqrt{\frac{1}{m-1}\sum_{i=1}^{m}\left(z_{ij} - \frac{1}{m}\sum_{i=1}^{m} z_{ij}\right)^2}}{\frac{1}{m}\sum_{i=1}^{m} z_{ij}} \qquad (j = 1,2,\ldots,m)$$

and

$$V_{i \cdot} = \frac{\sqrt{\frac{1}{m-1}\sum_{j=1}^{m}\left(z_{ij} - \frac{1}{m}\sum_{j=1}^{m} z_{ij}\right)^2}}{\frac{1}{m}\sum_{j=1}^{m} z_{ij}} \qquad (i = 1,2,\ldots m)$$

For a successful import-substitution policy one would have to obtain high import-substitution estimates coupled with relatively high U_j indexes (i.e. high backward linkage effects) and high U_i indexes (i.e. high forward linkage effects), with the backward linkages generally considered of far greater importance. Additionally one should have low $V_{\cdot j}$ and $V_{i \cdot}$ indexes of "variability" (indexes of "deviations"). Derivation of the V indexes is given in Tables XXVI to XXIX. But consider again the original source of information, the 1960 Ministry of Coordination Input-Output table. Although I have mentioned that this is the only existing official input-output table, I note that in a previous publication of the Center of Planning and Economic Research, J.B. Nugent presented a 19 x 19 sectors input-output table of the economy.[3] This table was for the year

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(1) David B. Humphrey : "The Determinants and Structure of Import Substitution", Western Economic Journal, 8, 1970, p. 255.

(2) K. Bharadwaj : "A Note on Structural Interdependence and the Concept of 'Key' Sector", Kyklos, Fasc. 2, 1966, 19, p. 315 ff.
Allen S. Manne : "Key Sectors of the Mexican Economy, 1960-1970", Studies in Process Analysis, J. Wiley, New York, 1963.

(3) Jeffrey B. Nugent : Programming the Optimal Development of the Greek Economy 1954-1961, Center of Planning and Economic Research, Athens, 1966, Appendix "C" (forming a separate volume), Table 4.14.

1961 and was derived from re-evaluating an earlier original unpublished 33 x 33 table for the year 1954 by S. Geronymakis.(1) Nugent does not reproduce the original table, but aggregates this to a 14 x 14 sectors level in Table 4.09, Appendix "C" of his monograph. It is not only the inconsistencies that stem from the use of different standard international classification systems in the case of the Geronymakis table that made the Nugent undertaking of updating the 1954 table to 1961 levels a rather risky exercise, but also the fact that the original Geronymakis table does not contain much information on the methodology employed, from which Nugent could have drawn dependable conclusions on the sources, reliability and form of the original data.(2) Additionally the updating process Nugent used required the use of trends from aggregate data, input-output tables from other countries, unquoted interviews with industry "experts", and even guesswork to substitute for unavailable statistical information.(3) Another aspect that raises controversy is that the 1954 table includes indirect taxes (amounting to about two-thirds of all government taxes) together with transport costs and service charges. Nugent tried to remove those taxes in producing an adjusted 14 x 14 table for 1954 prior to updating this latter by the Stone-Brown method to 1961 coefficients. Not only a lot of guesswork has gone into estimating and eliminating taxes by producing and importing sector for 1954, but the Stone-Brown revisions themselves have been revised to such an extent on the basis of rather arbitrary advice or intuition, that they are hardly recognisable in the end.

Even so, the Geronymakis-Nugent 1961 table could be of some use for my analysis if it could at least indicate some plausible changes in the structure of the 1960 ministry of coordination table over time. Unfor-

(1) S. Geronymakis : The Structural Interdependence of the Greek Economy in 1954. Athens, 1962, Unpublished. For an aggregated version see J.B. Nugent : Op.cit., Appendix "C", Tables 4.09 and 4.12.
(2) J.B.Nugent : Ibid, p. 61.
(3) Ibid. pp. 63-64.

tunately not only the arbitrary methods of construction of those tables do not guarantee small limits of errors, but additionally the division of the economy in sectors by Nugent comes nowhere near the grouping I have adopted from the National Accounts. Consequently in my further analysis I shall basically make use of the "official" 1960 input-output table, modified to my level of aggregation, as described in pp. 123-24 above.

TABLE XXIV

1960 16 x 16 Leontief Transposed Inverse Matrix of Coefficients

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Agriculture	1.451850	.031997	.691493	.317076	.117397	.334857	.028860	.256952	.044712	.030046	.025575	.026981	.090467	.065756	.029052	.063546
2	Mining	.009137	1.011258	.007772	.021624	.019221	.007182	.013440	.117527	.113074	.037275	.015933	.009460	.022365	.076436	.003068	.008817
3	Food-Drink-Tobacco	.033858	.015169	1.168057	.027007	.019728	.016883	.014505	.050002	.020128	.015294	.011473	.009493	.020478	.012596	.021471	.048363
4	Textiles	.021784	.008355	.019928	1.610712	.408501	.028688	.015545	.068445	.022664	.011745	.011011	.020407	.035624	.011694	.015990	.014076
5	Clothing-Footwear	.000239	.000493	.000733	.000349	1.000474	.000361	.000486	.000481	.000668	.000535	.000402	.000323	.000585	.000383	.000954	.001833
6	Wood-Cork-Furniture	.011037	.005846	.014846	.009973	.017121	1.182000	.031744	.014424	.012932	.011515	.015737	.025817	.020819	.134254	.026789	.015135
7	Paper-Printing	.009459	.009682	.028594	.021487	.025934	.031038	1.467384	.027789	.050857	.021761	.019887	.013262	.035968	.017527	.042779	.024857
8	Leath.-Rubb.-Plast. Chemicals-Petrol	.073284	.094809	.054393	.208224	.194542	.049892	.093102	1.259746	.122650	.069919	.060747	.055577	.219035	.076605	.021273	.066149
9	Non-metallic Minerals	.001365	.001319	.002869	.001691	.001529	.003313	.001477	.003847	1.049333	.004752	.005259	.003816	.001933	.156882	.001690	.003867
10	Basic Metal Industries	.012409	.020512	.009790	.013021	.011448	.066231	.017644	.014166	.024015	1.545475	.394938	.139475	.012213	.166023	.007576	.008735
11	Metal Prod.-Machin. Electr. Equipment	.037332	.038522	.028096	.039329	.033538	.080571	.050079	.039734	.053970	.209976	1.322259	.127077	.029856	.180884	.018730	.019835
12	Transport Equipment	.005315	.005623	.004217	.003434	.003001	.003318	.003741	.004450	.006802	.005706	.004083	1.396405	.003385	.004168	.004031	.022557
13	Miscellaneous Industries	.002121	.002297	.004572	.004321	.017929	.003132	.006187	.006704	.004303	.004016	.003933	.003400	1.064775	.002397	.009764	.006047
14	Construction	.004240	.001929	.004814	.004960	.004293	.005558	.004041	.004947	.011280	.007829	.006368	.003319	.006274	1.004241	.006669	.005143
15	Trade	.157612	.075315	.267313	.213957	.411589	.261895	.312780	.264718	.209786	.141502	.203345	.193579	.533367	.105657	1.031159	.041616
16	Services	.082848	.277105	.123754	.131386	.134994	.122425	.181611	.189927	.334333	.277650	.171627	.126430	.157707	.196680	.198079	1.122924

Note : Each entry shows, per drachma of deliveries to final demand by industry named at top , the total drachma production directly and indirectly required from industry named at left.

Source : Computed from the original 50x50 input output table of the Ministry of Coordination for 1960 (see A.Koutsoyiannis-Kokkova and A. Ganas: Input-Output Table of the Greek Economy (Year 1960), Center of Planning and Economic Research,Athens, 1967) aggregated to 16x16.

TABLE XXV

1960 16 x 16 Leontief transposed inverse Matrix of Coefficients :

Derivation of the $U_{.j}$ Index of Power of Dispersion (Backward-Linkage Effect)

and of the $U_{i.}$ Index of Sensitivity of Dispersion (Forward-Linkage Effect)

	$\sum_{j=1}^{n} Z_{ij}$	$\sum_{i=1}^{n} Z_{ij}$	$\frac{1}{n}\sum_{j=1}^{n} Z_{ij}$	$\frac{1}{n}\sum_{i=1}^{n} Z_{ij}$	$U_{.j} = \frac{\frac{1}{n}\sum_{i=1}^{n} Z_{ij}}{\frac{1}{n^2}\sum_{j=1}^{n}\sum_{i=1}^{n} Z_{ij}}$	$U_{i.} = \frac{\frac{1}{n}\sum_{j=1}^{n} Z_{ij}}{\frac{1}{n^2}\sum_{j=1}^{n}\sum_{i=1}^{n} Z_{ij}}$
1	3.616617	1.913890	.226039	.119618	0.899255	1.699069
2	1.492589	1.600231	.093287	.100014	0.751878	0.701211
3	1.504495	2.426669	.094031	.151667	1.140190	0.706803
4	2.325170	2.628551	.145323	.164284	1.235042	1.092350
5	1.009299	2.421239	.063081	.151327	1.137634	0.474161
6	1.549989	2.197344	.096874	.137334	1.032439	0.728173
7	1.848265	2.257627	.115517	.141102	1.060766	0.868307
8	2.725947	2.323859	.170372	.145241	1.091882	1.280636
9	1.244942	2.081507	.077809	.130094	0.978011	0.584867
10	2.463671	2.394996	.153979	.149687	1.125305	1.157415
11	2.309788	2.272577	.144362	.142036	1.067787	1.085127
12	1.480236	2.154821	.092515	.134676	1.012457	0.695408
13	1.145898	2.254851	.071619	.140928	1.059458	0.538339
14	1.085905	2.212183	.067869	.138261	1.039408	0.510151
15	4.425190	1.439074	.276574	.089942	1.059521	2.078925
16	3.829480	1.473500	.239343	.092094	1.039470	1.799071

$\sum_{j=1}^{n}\sum_{i=1}^{n} Z_{ij}$ = 34.057481 $\qquad \frac{1}{n^2}\sum_{j=1}^{n}\sum_{i=1}^{n} Z_{ij}$ = .133019

$\sum_{i=1}^{n}\sum_{j=1}^{n} Z_{ij}$ = 34.052919 $\qquad \frac{1}{n^2}\sum_{i=1}^{n}\sum_{j=1}^{n} Z_{ij}$ = .133037

Note : The $U_{.j}$ index is an estimate of the backward-linkage effects (power of dispersion) and the $U_{i.}$ index an estimate of the forward-linkage effects (sensitivity of dispersion).

TABLE XXV

1960 16 x 16 Leontief Transposed Inverse Matrix of Coefficients :

Derivation of the $U_{.j}$ Index of Power of Dispersion (Backward-Linkage Effect)

and of the $U_{i.}$ Index of Sensitivity of Dispersion (Forward-Linkage Effect)

	$\sum_{j=1}^{m} Z_{ij}$	$\sum_{i=1}^{m} Z_{ij}$	$\frac{1}{m}\sum_{j=1}^{m} Z_{ij}$	$\frac{1}{m}\sum_{i=1}^{m} Z_{ij}$	$\sum_{j=1}^{m}\sum_{i=1}^{m} Z_{ij}$	$\frac{1}{m^2}\sum_{j=1}^{m}\sum_{i=1}^{m} Z_{ij}$	$U_{.j} = \frac{\frac{1}{m}\sum_{i=1}^{m} Z_{ij}}{\frac{1}{m^2}\sum_{j=1}^{m}\sum_{i=1}^{m} Z_{ij}}$	$U_{i.} = \frac{\frac{1}{m}\sum_{j=1}^{m} Z_{ij}}{\frac{1}{m^2}\sum_{i=1}^{m}\sum_{j=1}^{m} Z_{ij}}$
1	3.616617	1.913890	.226039	.119618			0.899255	1.699069
2	1.492589	1.600231	.093287	.100014	34.057481	.133019	0.751878	0.701211
3	1.504495	2.426669	.094031	.151667			1.140190	0.706803
4	2.325170	2.628551	.145323	.164284			1.235042	1.092350
5	1.009299	2.421239	.063081	.151327			1.137634	0.474161
6	1.549989	2.197344	.096874	.137334			1.032439	0.728173
7	1.848265	2.257627	.115517	.141102	34.052919	.133037	1.060766	0.868307
8	2.725947	2.323859	.170372	.145241			1.091882	1.280636
9	1.244942	2.081507	.077809	.130094			0.978011	0.584867
10	2.463671	2.394996	.153979	.149687			1.125305	1.157415
11	2.309788	2.272577	.144362	.142036			1.067787	1.085127
12	1.480236	2.154821	.092515	.134676			1.012457	0.695408
13	1.145898	2.254851	.071619	.140928			1.059458	0.538339
14	1.085905	2.212183	.067869	.138261			1.039408	0.510151
15	4.425190	1.439074	.276574	.089942			1.059521	2.078925
16	3.829480	1.473500	.239343	.092094			1.039470	1.799071

Note : The $U_{.j}$ index is an estimate of the backward-linkage effects (power of dispersion) and the $U_{i.}$ index an estimate of the forward-linkage effects (sensitivity of dispersion).

TABLE XXVI

1960 16 x 16 Input-Output Table : Derivation of $Z_{ij} - \frac{1}{m}\sum_{i=1}^{m} Z_{ij}$

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.332232	-.068017	.539826	.152792	-.033930	.197523	-.102242	.111711	-.085382	-.119641	-.116461	-.107695	-.050461	-.072505	-.060890	-.028548
2	-.110481	.911244	-.143895	-.142660	-.132106	-.130152	-.128662	-.027714	-.017020	-.112412	-.126103	-.125216	-.118563	-.061825	-.086874	-.083277
3	-.085760	-.084845	1.016390	-.137277	-.131599	-.124551	-.126597	-.095239	-.109966	-.134393	-.130563	-.125183	-.120450	-.125665	-.068471	-.043731
4	-.097834	-.091659	-.131739	1.446428	.257174	-.108646	-.125556	-.076796	-.107430	-.137942	-.131026	-.114269	-.105304	-.126567	-.073952	-.078018
5	-.119379	-.099521	-.150934	-.163935	.849147	-.136973	-.140616	-.144760	-.129426	-.149152	-.141634	-.134353	-.140343	-.137878	-.088988	-.090261
6	-.108581	-.094168	-.136821	-.154311	-.134206	1.044666	-.109358	-.130817	-.117162	-.138172	-.126299	-.108859	-.120109	-.004007	-.063153	-.076959
7	-.110159	-.090332	-.123073	-.142797	-.125393	-.106296	1.326282	-.117452	-.079237	-.127926	-.122149	-.121414	-.104960	-.120734	-.047163	-.067237
8	-.046334	-.005205	-.097274	.043940	.043215	-.087442	-.042000	1.114505	-.007444	-.079768	-.081289	-.079099	.078107	-.061656	-.068669	-.025945
9	-.118253	-.098695	-.148798	-.162593	-.149798	-.134021	-.139625	-.141394	.919239	-.144935	-.136777	-.130860	-.138995	.018621	-.088252	-.088227
10	-.107209	-.079502	-.141877	-.151263	-.139879	-.071103	-.123458	-.131075	-.106079	1.395788	.252902	.004799	-.128715	.027762	-.082366	-.083359
11	-.082286	-.061492	-.123571	-.124955	-.117789	-.056763	-.091023	-.105507	-.076124	.060289	1.180223	-.007599	-.111072	.042623	-.071212	-.072259
12	-.114303	-.094391	-.147450	-.160850	-.148326	-.134016	-.137361	-.140791	-.123292	-.143981	-.137953	1.261729	-.137543	-.134093	-.085911	-.089537
13	-.117497	-.097717	-.147095	-.159963	-.133398	-.134202	-.134915	-.138537	-.125791	-.145671	-.138103	-.131276	.923847	-.135864	-.080178	-.086047
14	-.115378	-.098085	-.146853	-.159324	-.147034	-.131776	-.137061	-.140294	-.118814	-.141858	-.135668	-.131357	-.134654	.865980	-.083273	-.086951
15	.037994	-.024699	.115646	.049673	.260262	.124561	.171678	.119477	.079692	-.008185	.061309	.058903	.392439	-.032604	.941217	-.050478
16	-.036770	.177091	-.027913	-.032898	-.016333	-.014909	.040509	.044686	.204239	.127963	.029591	-.008246	.016779	.058419	.108137	1.030830

Note : The above estimates are used to derive the $V_{.j}$ variability ratios on Table XXVIII.

TABLE XXVII

1960 16 x 16 Input-Output Table : Derivation of $Z_{ij} - \frac{1}{m}\sum_{j=1}^{m} Z_{ij}$

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.225811	-.194042	.465454	.091037	-.108642	.108818	-.187179	.030913	-.181327	-.195993	-.200464	-.199058	-.135572	-.160283	-.166987	-.162493
2	-.084150	.917971	.085515	-.071663	-.074066	-.086105	-.080847	.024240	.019787	-.056012	-.077354	-.083827	-.070922	-.016851	-.090219	-.084470
3	-.060446	-.078862	1.074026	-.067024	-.074303	-.077148	-.079526	-.044029	-.073903	-.078737	-.082558	-.084538	-.073553	-.081435	-.072560	-.045668
4	-.123539	-.136968	-.125395	1.465389	.263178	-.116635	-.129777	-.976878	-.122659	-.133578	-.134312	-.124916	-.109699	-.133629	-.129333	-.131247
5	-.062842	-.062588	-.062348	-.062732	.937393	-.062720	-.062595	-.062600	-.062413	-.062546	-.062679	-.062758	-.062496	-.062698	-.062127	-.061248
6	-.085837	-.091028	-.082028	-.086901	-.079753	1.085126	-.065130	-.082450	-.083942	-.085359	-.081137	-.071057	-.076055	.037380	-.070085	-.081739
7	-.106058	-.105835	-.086923	-.094030	-.089583	-.084479	1.351867	-.037728	-.064660	-.093756	-.095630	-.102255	-.079549	-.097990	-.072738	-.090660
8	-.097088	-.075563	-.115979	.037852	.024170	-.120480	-.071270	1.089374	-.047722	-.100453	-.109625	-.114795	.048663	-.093767	-.149099	-.104223
9	-.076444	-.076490	-.074940	-.076118	-.076280	-.044679	-.076332	-.073962	.971524	-.073057	-.072550	-.073993	-.075876	.079073	-.076119	-.073942
10	-.141570	-.133467	-.144189	-.140958	-.142531	-.087748	-.136335	-.139813	-.129964	1.391496	.240959	-.014504	-.141766	.012044	-.146403	-.145244
11	-.107030	-.105842	-.116266	-.105033	-.110824	-.063791	-.094283	-.104628	-.090392	.065614	1.177897	-.017285	-.114506	.036522	-.125632	-.124527
12	-.087200	-.086892	-.088298	-.089081	-.089514	-.089197	-.088774	-.088065	-.085713	-.086809	-.088432	1.303890	-.089130	-.088347	-.088484	-.069958
13	-.069498	-.069322	-.067047	-.067298	-.053690	-.068487	-.065432	-.064915	-.067316	-.067603	-.067686	-.068219	.993156	-.069222	-.061855	-.065572
14	-.063629	-.065940	-.063055	-.062909	-.063576	-.062311	-.063828	-.062922	-.056589	-.060040	-.061501	-.064550	-.061595	.936372	-.061200	-.062726
15	-.118962	-.201259	-.009261	-.062617	.135015	-.014679	.036206	-.011856	-.066788	-.135072	-.073229	-.082995	.256793	-.170917	.754585	-.234958
16	-.156495	.037762	-.115589	-.107957	-.104349	-.116918	-.057732	-.049416	.094990	.038307	-.067716	-.112913	-.081636	-.042663	-.041264	.883581

Note : The above estimates are used to derive the V_i. variability ratios in Table XXIX.

TABLE XXVIII

1960 16 x 16 Leontief Transposed Inverse : Derivation of "Variability" Ratios

	$\sum_{i=1}^{m}\left(Z_{ij}-\frac{1}{m}\sum_{i=1}^{m}Z_{ij}\right)^2$	$\frac{1}{m-1}\sum_{i=1}^{m}\left(Z_{ij}-\frac{1}{m}\sum_{i=1}^{m}Z_{ij}\right)^2$	$\sqrt{\frac{1}{m-1}\sum_{i=1}^{m}\left(Z_{ij}-\frac{1}{m}\sum_{i=1}^{m}Z_{ij}\right)^2}$	$\frac{\sqrt{\frac{1}{m-1}\sum_{i=1}^{m}\left(Z_{ij}-\frac{1}{m}\sum_{i=1}^{m}Z_{ij}\right)^2}}{\frac{1}{m}\sum_{i=1}^{m}Z_{ij}}$
1 Agriculture	1.919525	.127968	.357726	2.99
2 Mining	.957445	.063830	.252645	2.53
3 Food-Drink-Tobacco	1.565270	.104180	.322769	2.13
4 Textiles	2.373029	.158202	.397746	2.42
5 Clothing-Footwear	1.044009	.069601	.263820	1.74
6 Wood-Cork-Furniture	1.306613	.087108	.295140	2.15
7 Paper-Printing	1.981310	.132087	.363457	2.58
8 Leather-Rubber-Plastics-Chemicals-Petrol	1.445473	.096365	.310427	2.14
9 Non-metallic Minerals	1.023280	.068219	.261187	2.01
10 Basic Metal Industries	2.179487	.145299	.381181	2.55
11 Metal Prod. - Machines - Electr. Equipm.	1.657956	.110530	.332460	2.34
12 Transport Equipment	1.754095	.116940	.341964	2.54
13 Miscellaneous Industries	1.186498	.079100	.281247	1.99
14 Construction	.871295	.058086	.241010	1.74
15 Trade	.978228	.065215	.255372	2.84
16 Services	1.139924	.075995	.275671	2.99

Note : The expression in the last column is the V_j measure of variability of dispersion of the backward linkage effects.

TABLE XXIX

1960 16 x 16 Leontief Transposed Inverse : Derivation of "Variability" Ratios

		$\sum_{j=1}^{m}(Z_{ij} - \frac{1}{m}\sum_{j=1}^{m} Z_{ij})^2$	$\frac{1}{m-1}\sum_{j=1}^{m}(Z_{ij} - \frac{1}{m}\sum_{j=1}^{m} Z_{ij})^2$	$\sqrt{\frac{1}{m-1}\sum_{j=1}^{m}(Z_{ij} - \frac{1}{m}\sum_{j=1}^{m} Z_{ij})^2}$	$\sqrt{\frac{1}{m-1}\sum_{j=1}^{m}(Z_{ij} - \frac{1}{m}\sum_{j=1}^{m} Z_{ij})^2} \Big/ \frac{1}{m}\sum_{j=1}^{m} Z_{ij}$
1	Agriculture	2.074298	.138287	.371869	1.65
2	Mining	.919353	.061290	.247568	2.65
3	Food-Drink-Tobacco	1.232651	.082177	.286665	3.05
4	Textiles	2.433106	.016207	.127306	2.77
5	Clothing-Footwear	.937288	.062486	.249971	3.96
6	Wood-Cork-Furniture	1.269572	.084638	.290926	3.00
7	Paper-Printing	1.951261	.130084	.360671	3.12
8	Leather-Rubber-Plastics-Chemicals-Petrol	1.318751	.087917	.296508	1.74
9	Non-metallic Minerals	1.025423	.068362	.261461	3.36
10	Basic Metal Industries	2.218860	.147924	.384608	2.50
11	Metal Prod. - Machines - Electr. Equipm.	1.529347	.101956	.319305	2.21
12	Transport Equipment	1.813795	.120920	.347735	3.76
13	Miscellaneous Industries	1.052341	.070156	.264869	3.70
14	Construction	.935312	.062354	.249707	3.68
15	Trade	.833275	.055552	.235694	0.85
16	Services	.899993	.060000	.244948	1.02

Note : The expression in the last column is the V_i. measure of variability of dispersion of the forward linkage effects.

II. I should notice at this point that in the construction of our input-output table nothing has been done to separate imports. I have noticed that imports are classified by the 1960 table to the sector which would produce them as a principal product in their country of origin. No distribution is offered in terms of competitive and non-competitive imports. In a separate row the table gives an estimate above the given value of imports of the 1960 indirect taxes on them. Other expenses are included in the inputs of the jth sector from the transportation and trade sectors.(1)

This serious deficiency of the input-output table means that input flows which are imported are treated as if they had to be domestically produced, and the larger the size of the import coefficients, the larger the larger the error in our calculations. Unfortunately there exist no separate local production and import flows to use for a distribution between the two, so that in a somewhat arbitrary allocation I separated domestic production from imports classified by producing sector by assuming that imports are distributed proportionately between intermediate uses and final demand. The proportionality assumption proposed by Leontief (1941) and used in some of the earlier input-output applications where lack of statistical documentation (similar to ours) hindered alternative specifications, makes imports everywhere proportional to outputs of user industries.(2) In other words a proportional input coefficient relates imports to total availability of domestic and imported products from the industry to which they are allocated.(3) This kind of relationship is reasonably satisfactory when there is little possibility of substitution from

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(1) Imports aggregated in a single row as in earlier Leontief tables are found in tables of countries like Mexico, 1950.

(2) W.W. Leontief : The Structure of the American Economy, 1919-1939. Second Edition, Oxford University Press, New York, 1951.

(3) H.B. Chenery and P.G. Clark : Interindustry Economics. Wiley & Sons, New York, 1967, p. 154.
W.I. Abraham and M. Hoffenberg : "Problems of Standardisation of Input-Output Statistics", T.Barna, Ed., Structural Interdependence and Economic Development. Macmillan, London, 1963, pp.352-3.

similar home-produced commodities.[1] In the context of the non-diversified structure of the Greek manufacturing industry in 1960, and of the existence of production bottlenecks in the structural interrelationships of developing economies where often there is hardly any significant interdependence between the different factors,[2] this is not an unreasonable assumption to make, particularly when faced with the impossibility of alternative formulations.

Therefore obtaining for each sector the proportion of imports to total supply M_i/Z_i, I derive a new matrix, multiplying each row of my recalculated inverse by M_i/Z_i.[3] The column aggregate $\sum_{i=1}^{m} Z_i$ is then defined as the total import coefficient for each branch (see p. 152 below).

Moreover it is possible to derive another matrix, which could be obtained in similar fashion, multiplying this time each row of the original inverse by $1 - (M_i/Z_i)$.[4] This would produce a "local production - no imports" table and this I present in Table XXX.[5] A calculation of backward and forward linkage effects this time would produce new and different estimates, which I denote by $\bar{U}_{.j}$ and $\bar{U}_{i.}$. New Rasmussen coefficients of variation $\bar{V}_{.j}$ and $\bar{V}_{i.}$ were also calculated to show those effects net of the impact of imports, in other words to show the "true" impact of changes in supply and demand on the Greek sector alone without the distortion introduced by imports. An expansion in the foreign sector (importers from abroad) to provide additional imports would otherwise be interpreted as an expansion of the corresponding Greek sector to meet this demand. The results of the new calculation of the $\bar{U}$ and $\bar{V}$ indexes are given in Tables XXXI to XXXV.

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(1) J.R.C. Lecomber : "Input-Output and the Trading Economy", W.F.Gossling, Ed., Input-Output in the U.K., Frank Cass, 1970, pp. 127-8.
(2) G.E. Eleish : "The Input-Output Model in a Developing Economy : Egypt", Tibor Barna, Ed., Op.cit., p. 202.
(3) G.C. Archibald : Op.cit., No.16, p. 33.
(4) Ibid. pp. 33-4.
(5) Table XXX is the transposed inverse of the matrix of coefficients.

TABLE XXX

1960 16 x 16 Leontief Transposed Inverse Excluding Imports

1	Agriculture	1.413804	.031159	.573572	.308767	.114321	.326082	.037842	.250219	.043540	.029259	.024905	.026274	.088096	.064033	.028291	.061881
2	Mining	.005881	.650854	.005002	.013917	.012371	.004622	.008006	.075641	.072775	.023990	.010255	.006089	.014394	.049195	.001975	.005675
3	Food-Drink-Tobacco	.032400	.014516	1.117762	.023844	.018879	.016156	.013980	.047849	.019261	.014635	.010979	.009084	.019596	.012054	.020546	.046281
4	Textiles	.019509	.007482	.017847	1.442492	.365838	.025692	.013922	.061297	.020297	.010518	.009861	.018276	.031904	.010473	.014320	.012606
5	Clothing-Footwear	.000237	.000489	.000727	.000346	.001736	.000358	.000482	.008477	.000662	.000530	.000398	.000320	.000580	.000380	.000946	.001817
6	Wood-Cork-Furniture	.009837	.005210	.013232	.008889	.015259	1.053481	.028292	.012856	.011526	.010263	.014026	.023010	.018555	.119657	.023976	.013489
7	Paper-Printing	.007991	.008179	.024156	.018152	.021909	.026221	1.239647	.023476	.042964	.018384	.016801	.011204	.030386	.014807	.036140	.020999
8	Leath.-Rubb.-Plast. Chemicals-Petrol	.062248	.080531	.046201	.176856	.165244	.042378	.084177	1.070030	.104179	.059389	.051599	.047207	.186049	.065068	.018069	.056187
9	Non-metallic Minerals	.001242	.001200	.002611	.001539	.001392	.003015	.001344	.003501	.955015	.004325	.004786	.003473	.001759	.142781	.001538	.003519
10	Basic Metal Industries	.006775	.011199	.005345	.007109	.006250	.036161	.009653	.007734	.013112	.843808	.215631	.076151	.006668	.090646	.004136	.004769
11	Metal Prod.-Machin. Electr. Equipment	.025285	.026091	.019030	.026638	.022716	.054571	.033919	.026912	.036554	.142219	.895578	.086070	.020222	.122514	.012686	.013434
12	Transport Equipment	.003323	.003516	.002637	.002147	.001877	.002075	.002339	.002783	.004253	.003568	.002553	.873175	.002117	.002606	.002521	.014105
13	Miscellaneous Industries	.001704	.001846	.003673	.003472	.014405	.002516	.004571	.005387	.003457	.003227	.003160	.002732	.855521	.001926	.007845	.004859
14	Construction	.004240	.001929	.004814	.004960	.004293	.005558	.004041	.004947	.011280	.007829	.006368	.003319	.006274	1.004241	.006669	.005143
15	Trade	.157612	.755315	.267313	.213957	.411589	.261895	.312780	.264718	.209786	.141502	.203345	.193579	.533367	.105657	1.031159	.041616
16	Services	.080497	.269243	.120243	.127658	.131164	.119951	.176488	.184538	.324847	.269772	.166757	.122843	.153232	.191100	.192459	1.091063

Note : Derived by multiplying each row of the inverse on Table XXIV by $1 - M/Z$, where M/Z is the share of imports on total supply. M/Z from Table XL, 1960 entries.

TABLE XXXI

1960 16 x 16 Leontief Transposed Inverse Matrix of Coefficients : Net of Imports (Local Output Only)

Derivation of the $U_{.j}$ Index of Power of Dispersion (Backward-Linkage Effect)

and of the $U_{i.}$ Index of Sensitivity of Dispersion (Forward-Linkage Effect) .

	$\sum_{j=1}^{m} Z_{ij}$	$\sum_{i=1}^{m} Z_{ij}$	$\frac{1}{m}\sum_{j=1}^{m} Z_{ij}$	$\frac{1}{m}\sum_{i=1}^{m} Z_{ij}$	$\bar{U}_{.j} = \frac{\frac{1}{m}\sum_{j=1}^{m} Z_{ij}}{\frac{1}{m^2}\sum_{j=1}^{m}\sum_{i=1}^{m} Z_{ij}}$	$\bar{U}_{i.} = \frac{\frac{1}{m}\sum_{j=1}^{m} Z_{ij}}{\frac{1}{m^2}\sum_{i=1}^{m}\sum_{j=1}^{m} Z_{ij}}$
1	3.521845	1.832585	.220115	.114537	0.997866	1.917980
2	0.960642	1.188759	.060040	.074297	0.647288	0.523161
3	1.439722	2.319393	.089983	.144962	1.262933	0.784070
4	2.082334	2.382753	.130146	.148922	1.299733	1.134032
5	1.000485	2.299244	.062530	.143703	1.251965	0.548557
6	1.381458	1.979732	.086341	.123733	1.077983	0.752335
7	1.561416	1.971733	.097589	.123233	1.073627	0.850345
8	2.315422	2.042365	.144714	.127648	1.112091	1.260970
9	1.133040	1.873508	.070815	.117094	1.020143	0.617049
10	1.345127	1.583218	.084070	.098951	0.862078	0.732547
11	1.564439	1.637002	.097777	.102313	0.891368	0.851983
12	0.925595	1.502806	.057850	.093925	0.818290	0.504078
13	0.920701	1.968720	.057544	.123045	1.071989	0.501412
14	1.085905	1.997138	.067869	.124821	1.087461	0.591379
15	4.425190	1.403176	.276574	.087699	0.764048	2.409937
16	3.720825	1.397444	.232552	.087340	0.760921	2.026350

$\sum_{j=1}^{m}\sum_{i=1}^{m} Z_{ij}$ = 29.384146 ; $\frac{1}{m^2}\sum_{j=1}^{m}\sum_{i=1}^{m} Z_{ij}$ = .114782

$\sum_{i=1}^{m}\sum_{j=1}^{m} Z_{ij}$ = 29.379576 ; $\frac{1}{m^2}\sum_{i=1}^{m}\sum_{j=1}^{m} Z_{ij}$ = .114764

Note : The $\bar{U}_{.j}$ index is an estimate of the backward-linkage effects (power of dispersion) and the $\bar{U}_{i.}$ index an estimate of the forward-linkage effects (sensitivity of dispersion) , excluding the inter industry effects of imports.

TABLE XXXII

1960 16 x 16 Input-Output Table - Local Output Only, No Imports :

Derivation of $Z_{ij} - \frac{1}{m}\sum_{i=1}^{m} Z_{ij}$

1	1.299267	-.043138	.528410	.159845	-.029382	.202349	-.085391	.122571	-.073554	-.069692	-.077408	-.067651	-.034949	-.060788	-.059408	-.025459
2	-.108656	.576557	-.139960	-.135005	-.131332	-.119111	-.115227	-.052007	-.044319	-.074961	-.092058	-.087836	-.108651	-.075626	-.085724	-.081665
3	-.082137	-.059781	.972800	-.123078	-.124824	-.107577	-.109353	-.079799	-.097833	-.084316	-.091334	-.084841	-.103449	-.112767	-.067153	-.041059
4	-.095028	-.066815	-.127115	1.293570	.222135	-.098041	-.109311	-.066351	-.096797	-.088433	-.092452	-.075649	-.091141	-.114348	-.073379	-.074734
5	-.114300	-.073808	-.144235	-.148576	.848033	-.123375	-.122751	-.127171	-.116432	-.098421	-.101915	-.093605	-.122465	-.124441	-.086753	-.085523
6	-.104700	-.069087	-.131730	-.140033	-.128444	.929748	-.094941	-.114792	-.105568	-.088688	-.088287	-.070915	-.104490	-.005164	-.063823	-.073851
7	-.106546	-.066118	-.120806	-.130770	-.121794	-.097512	1.116414	-.104172	-.074130	-.080567	-.085512	-.082721	-.092659	-.110014	-.051559	-.066341
8	-.052289	.006234	-.098761	.027944	.021541	-.081355	-.039056	.942382	-.012915	-.039562	-.050714	-.046718	.063004	-.059753	-.069630	-.031153
9	-.113295	-.073097	-.142351	-.147383	-.142311	-.120718	-.121889	-.124147	.837921	-.094626	-.097527	-.090452	-.121286	.017960	-.086161	-.083821
10	-.107762	-.063098	-.139617	-.141813	-.137453	-.087572	-.113600	-.119914	-.103982	.744857	.113318	-.017774	-.116377	-.034175	-.083563	-.082571
11	-.089252	-.048206	-.125932	-.122284	-.120987	-.069162	-.089314	-.100736	-.080540	.043268	.793265	-.007855	-.102823	-.002307	-.075013	-.073906
12	-.111214	-.070781	-.142325	-.146775	-.141826	-.121658	-.120894	-.124865	-.112841	-.095383	-.099760	.779250	-.120928	-.122215	-.085178	-.073235
13	-.112833	-.072451	-.141289	-.145450	-.129298	-.121217	-.118262	-.122261	-.113637	-.095724	-.099153	-.091193	.732476	-.122895	-.079854	-.082481
14	-.110297	-.072368	-.140148	-.143962	-.139410	-.118175	-.119192	-.122701	-.105814	-.091122	-.095945	-.090606	-.116771	.879420	-.081030	-.082197
15	.043075	.001018	.122351	.065035	.267886	.138162	.189547	.137070	.092692	.042551	.101032	.099654	.410322	-.019164	.943460	-.045724
16	-.034040	.194946	-.024719	-.021264	-.012539	-.004782	.053255	.056890	.207753	.170821	.064444	.028918	.030187	.066279	.104760	1.003723

Note : The above estimates are used to derive the $\bar{V}_{.j}$ variability ratios on Table XXXIV (excluding imports).

TABLE XXXIII

1960 16 x 16 Input-Output Table - Local Output Only, No Imports :

Derivation of $Z_{ij} - \frac{1}{m}\sum_{i=1}^{m} Z_{ij}$

1	1.193689	-.188956	.453257	.088652	-.105794	.105967	-.182273	.030104	-.176575	-.190856	-.195210	-.193841	-.132019	-.156082	-.191824	-.159234
2	-.054159	.590814	-.055038	-.046123	-.047669	-.055418	-.052034	.015601	.012735	-.036050	-.049785	-.053951	-.045646	-.010845	-.053065	-.054365
3	-.057583	-.075467	1.027779	-.064139	-.071104	-.073827	-.076103	-.042134	-.070722	-.075348	-.079004	-.080999	-.070397	-.077929	-.069437	-.047355
4	-.110637	-.122654	-.112299	1.312346	.235692	-.104454	-.116224	-.068849	-.109849	-.119628	-.120285	-.111870	-.098242	-.119673	-.115826	-.117540
5	-.062293	-.062041	-.061803	-.062184	.929206	-.062172	-.062048	-.062053	-.061868	-.062000	-.062132	-.062210	-.061950	-.062150	-.061584	-.060713
6	-.076504	-.081131	-.073109	-.077452	-.071082	.967141	-.058049	-.073485	-.074815	-.076078	-.072315	-.063331	-.057786	.033316	-.062465	-.072852
7	-.089598	-.089410	-.073433	-.079437	-.075680	-.071368	1.142058	-.074113	-.054625	-.079205	-.080788	-.086385	-.067203	-.082782	-.061449	-.076590
8	-.092466	-.064183	-.098513	.032152	.020530	-.102336	-.060537	.925316	-.040535	-.085325	-.093115	-.097507	.041335	-.079646	-.126545	-.088527
9	-.069573	-.069615	-.068204	-.069276	-.069423	-.067800	-.069471	-.067314	.884200	-.066490	-.066029	-.067342	-.069056	.071966	-.069277	-.067296
10	-.077295	-.072871	-.078725	-.076961	-.077820	-.047909	-.074437	-.076336	-.070958	.759738	.131561	-.007919	-.077402	-.006576	-.079934	-.079301
11	-.072492	-.071686	-.078747	-.071139	-.075061	-.043206	-.063859	-.070865	-.061223	.044442	.797801	-.011707	-.077555	.024737	-.085091	-.084343
12	-.024620	-.054334	-.055213	-.055703	-.055973	-.055775	-.055511	-.055067	-.056597	-.054282	-.055297	.915325	-.055733	-.055244	-.055829	-.043745
13	-.055840	-.055698	-.053871	-.054072	-.043139	-.055028	-.052773	-.052157	-.054087	-.054317	-.054394	-.054812	.797977	-.055618	-.049699	-.052815
14	-.063629	-.065940	-.063055	-.062909	-.063576	-.062311	-.063938	-.062922	-.056589	-.060040	-.061501	-.064550	-.061595	.936372	-.061200	-.062726
15	-.118962	-.201259	-.009261	-.062617	.135015	-.014679	.036203	-.011856	-.056788	-.135072	-.073229	-.082995	.256793	-.170917	.754585	-.234958
16	-.152055	.036691	-.112309	-.104894	-.101388	-.113601	-.055094	-.048014	.092295	.057220	-.065795	-.109709	-.079320	-.041452	-.040093	.858511

Note : The above estimates are used to derive the $\bar{V}_i$ variability ratios in Table XXXV (excluding imports).

TABLE XXXIV

1960 16 x 16 Leontief Transposed Inverse Excluding Imports : Derivation of "Variability" Ratios

	$\sum_{i=1}^{m} (Z_{ij} - \frac{1}{m}\sum_{i=1}^{m} Z_{ij})^2$	$\frac{1}{m-1}\sum_{i=1}^{m} (Z_{ij} - \frac{1}{m}\sum_{i=1}^{m} Z_{ij})^2$	$\sqrt{\frac{1}{m-1}\sum_{i=1}^{m}(Z_{ij} - \frac{1}{m}\sum_{i=1}^{m} Z_{ij})^2}$	$\frac{\sqrt{\frac{1}{m-1}\sum_{i=1}^{m}(Z_{ij} - \frac{1}{m}\sum_{i=1}^{m} Z_{ij})^2}}{\frac{1}{m}\sum_{i=1}^{m} Z_{ij}}$
1 Agriculture	1.826483	.121766	.348949	3.05
2 Mining	.422098	.028140	.167749	2.26
3 Food-Drink-Tobacco	1.454866	.096991	.311433	2.15
4 Textiles	1.916705	.127780	.357463	2.40
5 Clothing-Footwear	1.015963	.067731	.260251	1.81
6 Wood-Cork-Furniture	1.061694	.070780	.266045	2.15
7 Paper-Printing	1.433774	.095585	.309168	2.51
8 Leather-Rubber-Plastics-Chemicals-Petrol	1.064342	.070956	.266375	2.09
9 Non-metallic Minerals	.864685	.057646	.240095	2.05
10 Basic Metal Industries	.674207	.044947	.212007	2.14
11 Metal Prod. - Machines - Electr. Equipm.	.754392	.050293	.224261	2.19
12 Transport Equipment	.691113	.046074	.214648	2.29
13 Miscellaneous Industries	.843389	.056226	.237120	1.93
14 Construction	.876067	.058404	.241669	1.94
15 Trade	.981201	.065413	.255759	2.92
16 Services	1.080507	.072034	.268391	3.07

Note : The expression in the last column is the $\bar{V}_j$ measure of variability of dispersion of the backward linkage effects, excluding the interindustry effects of imports.

TABLE XXXIV

1960 16 x 16 Leontief Transposed Inverse Excluding Imports : Derivation of "Variability" Ratios

		$\sum_{i=1}^{m} (z_{ij} - \frac{1}{m}\sum_{i=1}^{m} z_{ij})^2$	$\frac{1}{m-1}\sum_{i=1}^{m} (z_{ij} - \frac{1}{m}\sum_{i=1}^{m} z_{ij})^2$	$\sqrt{\frac{1}{m-1}\sum_{i=1}^{m} (z_{ij} - \frac{1}{m}\sum_{i=1}^{m} z_{ij})^2}$	$\frac{\sqrt{\frac{1}{m-1}\sum_{i=1}^{m} (z_{ij} - \frac{1}{m}\sum_{i=1}^{m} z_{ij})^2}}{\frac{1}{m}\sum_{i=1}^{m} z_{ij}}$
1	Agriculture	1.826483	.121766	.348949	3.05
2	Mining	.422098	.028140	.167749	2.26
3	Food-Drink-Tobacco	1.454866	.096991	.311433	2.15
4	Textiles	1.916705	.127780	.357463	2.40
5	Clothing-Footwear	1.015963	.067731	.260251	1.81
6	Wood-Cork-Furniture	1.061694	.070780	.266045	2.15
7	Paper-Printing	1.433774	.095585	.309168	2.51
8	Leather-Rubber-Plastics-Chemicals-Petrol	1.064342	.070956	.266375	2.09
9	Non-metallic Minerals	.864685	.057646	.240095	2.05
10	Basic Metal Industries	.674207	.044947	.212007	2.14
11	Metal Prod. - Machines - Electr. Equipm.	.754392	.050293	.224261	2.19
12	Transport Equipment	.691113	.046074	.214648	2.29
13	Miscellaneous Industries	.843389	.056226	.237120	1.93
14	Construction	.876067	.058404	.241669	1.94
15	Trade	.981201	.065413	.255759	2.92
16	Services	1.080507	.072034	.268391	3.07

Note : The expression in the last column is the $\bar{V}_j$ measure of variability of dispersion of the backward linkage effects, excluding the inter industry effects of imports.

TABLE XXXV

1960 16 x 16 Leontief Transposed Inverse Excluding Imports : Derivation of "Variability" Ratios

		$\sum_{j=1}^{m} (Z_{ij} - \frac{1}{m}\sum_{j=1}^{m} Z_{ij})^2$	$\frac{1}{m-1}\sum_{j=1}^{m}(Z_{ij} - \frac{1}{m}\sum_{j=1}^{m} Z_{ij})^2$	$\sqrt{\frac{1}{m-1}\sum_{j=1}^{m}(Z_{ij} - \frac{1}{m}\sum_{j=1}^{m} Z_{ij})^2}$	$\frac{\sqrt{\frac{1}{m-1}\sum_{j=1}^{m}(Z_{ij} - \frac{1}{m}\sum_{j=1}^{m} Z_{ij})^2}}{\frac{1}{m}\sum_{j=1}^{m} Z_{ij}}$
1	Agriculture	1.977359	.131824	.363075	1.65
2	Mining	.380826	.025388	.159336	2.65
3	Food-Drink-Tobacco	1.129084	.075272	.274357	3.05
4	Textiles	1.951426	.130095	.360686	2.77
5	Clothing-Footwear	.920988	.061399	.247788	3.96
6	Wood-Cork-Furniture	1.037335	.069156	.262975	3.05
7	Paper-Printing	1.392590	.092839	.304694	3.12
8	Leather-Rubber-Plastics-Chemicals-Petrol	.951457	.063430	.251853	1.74
9	Non-metallic Minerals	.852313	.056821	.238371	3.25
10	Basic Metal Industries	.661445	.044096	.209990	2.50
11	Metal Prod. - Machines - Electr. Equipm.	.701584	.046772	.216268	2.21
12	Transport Equipment	.706832	.047122	.217076	3.75
13	Miscellaneous Industries	.679362	.045291	.212816	3.70
14	Construction	.935312	.062354	.249707	3.68
15	Trade	.833275	.055552	.235694	0.85
16	Services	.849646	.056643	.237997	1.02

Note : The expression in the last column is the $\bar{V}_i$ measure of variability of dispersion of the forward linkage effects. The measure is identical in both versions (including and excluding exports).

III. An index of foreign capital participation would also be desirable in this context to give an indication of the level and direction of foreign capital in each branch of the industry. As such an index K^f/K^t, the share of foreign-owned net capital stock to total net capital stock was constructed. The values of the index for the years 1960 and 1966 are given in Table XXXVI together with the estimates of net import substitution from my previous chapter and the indices of linkage effects and variability of dispersion in both versions (including and excluding exports). 1960 was chosen as an index year for participation of foreign capital as earlier years showed very low level of foreign capital participation in most branches and 1960 was thought to be a more representative mid-period indicator. A full description of the assumptions, sources and methods concerning the construction of the two capital stock estimates is given in a subsequent chapter.(1) Foreign-owned capital stock is estimated under the assumption that no mergers or takeovers of foreign concerns by Greek nationals had taken place, and this was true to the best of my knowledge. In some cases the degree of foreign participation is not always as high as it seems, because some share of this foreign capital is owned by Greeks from abroad. But if the state and the foreign investment legislation choose to grant them the same treatment as the foreigners then I could certainly do the same myself in my treatment in this context.

The level of foreign capital participation deserves some further consideration. As can be seen in Table XXXVI it increased in most branches from 1960 to 1966, with the exception of wood-furniture industries (25-26), paper and printing (27-28) and transport equipment (38). The first two remained more or less at the average level of foreign capital participation of 1960 with only a slight drop, but the third branch where the huge Hellenic Shipyards investments formed the bulk of all stock in 1960, shows a considerable drop to a still-high 39% foreign participation in 1966, despite not insignificant foreign investments in other forms of transport.

(1) See Chapter Nine, Para. C', below. Also see p. 101 above.

Foreign capital participation in 1966 could therefore be classified in three categries : High rate of foreign capital participation in chemicals and allied products (29-32), basic metal industries (34) and transport equipment (38) ; medium rate of foreign capital participation in clothing-footwear (24), wood-furniture (25-26), paper-printing (27-28), nonmetallic minerals (33) and to a lesser degree in metal products and electrical equipment (35-37) ; and low rate of foreign capital participation in food-drink-tobacco industries (20-22), textiles (23) and miscellaneous industries (39).

In 1960 , by contrast, foreign capital participation rates were much lower indeed, as one could expect, with only one branch at a high rate (transport equipment - 38) and two branches at medium-level participation (wood-furniture industries - 25-26, and paper-printing -27-28). All other industries in 1960 had low foreign capital participation.

TABLE XXXVI

Foreign Capital, Import Substitution and the Inter Industry Relations : A Summary Chart

(Estimates Excl. Imports in Parenth.)

	K^f/K^t : Foreign Share of Stock		Net Import Substitution	$U_{.j}$ $(\bar{U}_{.j})$	$U_{i.}$ $(\bar{U}_{i.})$	$V_{.j}$ $(\bar{V}_{.j})$	$V_{i.}$ & $\bar{V}_{i.}$
	1960	1966	1958 - 1966	Backward-Linkage Effects	Forward-Linkage Effects	Backward-Variability	Forward-Variability
20-22 Food-Drink-Tobacco	.0117	.0243	0.062918	1.1402 (1.2629)	0.7068 (0.7841)	2.13 (2.15)	3.05
23 Textiles	.0005	.0427	0.046247	1.2350 (1.2974)	1.0924 (1.1340)	2.42 (2.40)	2.77
24 Clothing-Footwear	.0266	.1514	*	1.1376 (1.2520)	0.4742 (0.5449)	1.74 (1.81)	3.96
25-26 Wood-Cork-Furniture	.1253	.1084	*	1.0324 (1.0780)	0.7282 (0.7523)	2.15 (2.15)	3.05
27-28 Paper-Printing	.1379	.1140	0.076548	1.0608 (1.0736)	0.8683 (0.8503)	2.58 (2.51)	3.12
29-32 Leather-Rubber-Plastic Chem.Petrol	.0632	.5545	0.284918	1.0919 (1.1121)	1.2806 (1.2610)	2.14 (2.09)	1.74
33 Non-metallic Minerals	.0202	.1252	*	0.9780 (1.0201)	0.5849 (0.6170)	2.01 (2.05)	3.25
34 Basic Metal Industries	.0000	.4280	0.052289	1.1253 (0.8621)	1.1574 (0.7325)	2.55 (2.14)	2.50
35-37 Metal Prod. Machinery-Electr.Eq.	.0535	.0843	0.029270	1.0678 (0.8914)	1.0851 (0.8520)	2.34 (2.19)	2.21
38 Transport Equipment	.6617	.3915	0.077203	1.0125 (0.8183)	0.6954 (0.5041)	2.54 (2.29)	3.76
39 Miscellan. Industries	.0008	.0254	*	1.0595 (1.0720)	0.5383 (0.5014)	1.99 (1.93)	3.70

IV. Import substitution did not occur in all branches of the manufacturing industry at the same level as I have established in the previous chapter. As can be seen in Table XXVI there was net import substitution at a not insignificant level achieved in branch 20-22 (food-drink-tobacco) in the period 1958-1966. Coupled with this nevertheless, are a particularly low forward linkage effect and rather high variability ratios. Excluding imports the linkage effects are a little higher, although the forward linkage effect still at a dissapointing low level. Variability ratios are substantially the same. The latter in fact applies only to the $V._j$ ratio as the $V_{i.}$ ratio is expected to be the same in any case imports or no imports. On the whole 20-22 looks as a rather low-expansion-potential sector as far as the economy-wide effects are concerned, with foreign investors also sparingly represented. The importance of this sector lies with the high level of long-established capacity rather than with its dynamic structural properties.

Textiles (23) was another branch of low foreign capital participation, where net import substitution was lower than in the food industries and gross even more so. The increase in foreign capital participation in the second half of the period is not likely to have generated any notable shift towards import substitution, since at such a low level of foreign participation any such influence could hardly make itself felt. Very high backward and forward linkage effects are only increased if we discount imports, but are accompanied by high variability ratios. An expansion in textiles would most likely leave practically unchanged the final demand in a great many other industries, because the structure of interindustry relations implies that with such poor dispersion ratios textiles draw heavily on very few of the other industries. There are also one-sided heavy demands on textiles, as very few of the other industries depend on textile inputs, even if the few industries which do depend on them do so to a very great extent. It follows that despite the good lin-

kage effects textiles have not been a typical "key" industry where external help would bring about widespread repercussions to be felt throughout the economy. Whether such limitations have in fact been instrumental in discouraging foreign capital or whether constraints on the demand side coupled with deficiencies in the production structure have also played a part is something we shall discuss in a later chapter.

Clothing and footwear (24) are characterized by rather high backward linkages but also display the lowest forward linkages in any industry. The backward linkages are accompanied by an extremely even distribution of inputs from other sectors, but the unsatisfactory forward linkages are coupled with the worse forward linkage effects in the industry, which undoubtedly would have constrained the expansionary effect that relatively high foreign participation by 1966 may have brought about. This rather unsatisfactory structure is accompanied by complete absence of import substitution in the 1958-1966 period.

Wood-cork-furniture industries (25-26) show rather low backward and forward linkage effects, so that even with reasonably low "variability" coefficients, the average-level foreign capital participation is not likely to have brought about an expansion in the system of other industries. Import substitution was negative and this together with the poor export performance of the branch throughout the period reflects a poor structure of production.

Paper and printing industries (27-28) offer a slightly higher degree of foreign capital participation, and some degree of import substitution. The linkages are a little more satisfactory than the ones of the wood industries, but again this little advantage is all but eliminated by much higher "variability" characteristics, revealing a relative one-sidedness of the demand and supply pattern with respect to interindustry relations.

Branch 29-32 (leather-rubber-plastics-chemicals-petrol) shows a very considerable increase in the share of foreign capital. This increase is

accompanied by the highest rate of net import substitution throughout the industry by a wide margin. The heavy import-substituting character of petrol products comes of course immediately to mind, but it would be a mistake to confine the effect to this particular activity alone. The backward linkage effect, although rather high, is a little lower than that in some consumer industries, but in general all characteristics are very favourable : they include the highest level of forward linkages in the industry, together with very low "variability" indexes (the V_i. index the lowest in the industry). Branch 29-32 obviously looks like a highly attractive "key" industry for expansion.

The performance of the component industries in that group (29-32) obviously varied and I note from my import and export calculations that chemicals showed an increase in exports from 1,438,650 dr. in 1960 to 3,011,324 dr. in 1966 at current prices, with a simultaneous drop in imports in the same period from 257,115 dr. to 183,617 dr. Leather products on the other hand showed an increase in imports from 233,809 dr. in 1960 to 398,202 dr. in 1966, but showed an even larger increase in exports from 350,272 dr. in 1960 to 650,286 dr. in 1966. Predictably not all the component industries in the group had happy results. Plastics and rubber nearly doubled their imports at current prices in the period 1960-1966 to 1,162,714 dr., but provided a mere 89,363 dr. for exports. Clearly the export potential of numerous large foreign investments in such activities had not been fully realised by 1966 perhaps due to capacity constraints.

Non-metallic minerals (33) show some considerable increase in the participation of foreign capital, but no evidence of import substitution whatever. The linkage effects are also small so as to restrict severely the effect of this industry on others in the manufacturing sector.

The same is true with basic metal industries (34). A very considerable increase in the share of foreign capital, rising from no foreign

accompanied by the highest rate of net import substitution throughout the industry by a wide margin. The heavy import-substituting character of petrol products comes of course immediately to mind, but it would be a mistake to confine the effect to this particular activity alone. The backward linkage effect, although rather high, is a little lower than that in some consumer industries, but in general all characteristics are very favourable : they include the highest level of forward linkages in the industry, together with very low "variability" indexes (the V_i. index the lowest in the industry). Branch 29-32 obviously looks like a highly attractive "key" industry for expansion.

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The same is true with basic metal industries (34). A very considerable increase in the share of foreign capital, rising from no foreign

capital in 1960 to something approaching half the stock in 1966 is accompanied by high linkage effects, which nevertheless, if we exclude imports become very low and reflect a rather unsatisfactory structure of interindustry relations. Import substitution has been at an average-to-low level, although it has ranked high in the mind of some experts in planning the development of the sector. In the end about ten per cent of the increase in manufacturing production for use in Greece was due to replacement of domestic for imported manufactures. More revealing is the statistical evidence of a continuing rise in imports of unwrought aluminium from a level of 67,880,541 dr. in 1960 to 102,408,926 dr. in 1966 at current prices, even though the establishment of the French-financed Pechiney Co. resulted in the increase in production in the same period of time sufficient to allow a rise in exports of the same commodity (unwrought aluminium) from 95,908 dr. in 1960 to 397,006,184 dr. in 1966 at current prices. This seems to confirm the lack of deliberate import-substituting policies from the part of foreign-financed concerns and could be interpreted to show the degree of deliberate export creation bias in the foreign-financed sector.

Metal products (35-37) show a low-level import substitution with low (in the case of no-imports with very low) linkage effects despite the fact that in a sector of such diversified production (metal products in general, machinery of all kinds, electrical and electronic equipment and appliances) one could expect wider repercussions in the industry as a whole. This is a branch of tremendous expansion potential hardly touched by the production and capacity performance up to 1966, and certainly not sustained by the results of the preceeding analysis.

Some considerable import substitution has taken place in branch 38 (transport equipment), but the backward and forward linkages taking account of the imports are very low. The branch itself is clearly a conglomerate of such diverse products that one could expect in particular cases devia-

tions from the coefficients obtained here. Import replacement has been a considerable factor in the development of the industry, and foreign participation has been very high throughout the period, but has one peculiarity, since in shipbuilding in particular, this foreign capital participation was largely of expatriate Greek ownership.

The results of the recalculation of forward and backward linkage effects net of imports throughout the range of industries, deserve some further notice. In some cases they show up differences which are indeed pronounced. Backward linkages $\bar{U}_{.j}$ are higher in the net of imports version for the consumer industries and intermediate industries like chemicals and non-metallic minerals, but are significantly lower in the "heavy" industry sector (capital goods), such as basic metal industries, metal products and machinery including electrical and transport equipment. Forward linkages $\bar{U}_{i.}$ are higher only in the food industries, textiles and clothing. They are lower in basic metal industries, metal products and machinery and transport equipment. They remain substantially the same in other industries.

V. The economic significance of the results is quite wide-ranging. It is easy to show that markets existed in Greece due to rapidly increasing national income for the development of consumer-goods-oriented industries, particularly as there was little indigenous manufacturing capacity in the first instance. Additionally such consumer industries required less capital outlays than heavy industries. But from the point of view of import substitution Lewis and Soligo[1] have shown that import substitution has been equally important in consumer-good, intermediate and capital-good industries (investment-good industries) in Pakistan, so that there is no a priori reason to expect a consistent pattern one way or the other.

There have been arguments, on the other hand, that import substitution in consumer industries may not always be a good thing.[2] It removes an effective foreign exchange constraint on the expansion of consumption and may have a depressive effect on savings. Additionally the higher domestic prices, sometimes sustained by tariff walls, absorb some part of the potential increase in real income.[3] Such high-cost industries deviate from the principle of comparative advantage.

In Greece where investment criteria reflected the desire to maximise the net foreign exchange earned or saved, taking full account of the scarcity of capital at the same time, it was important to encourage import substitution in industries characterised by relatively low ratios of imported inputs. It was also important to design for export promotion in industries with relatively high ratio of net foreign exchange earnings per unit of exports. In this respect import substitution in Greece ta-

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(1) S.R. Lewis and R. Soligo : Op.cit., p. 94 ff.
R. Soligo and J.J. Stern : "Tariff Protection, Import Substitution and Investment Efficiency", Pakistan Development Review, 5, 1965, p. 251.

(2) J.H. Power : "Industrialisation in Pakistan. A Case of Frustrated Take-Off?", Ibid. Summer 1963, p. 119.
A.R. Khan : "Import Substitution, Export Expansion and Consumer Liberalisation : A Preliminary Report", Ibid, Summer 1963, p. 208.

(3) Harry G. Johnson : "Tariffs and Economic Development", Journal of Development Studies, October 1964, p. 3 ff.

king place in branches 20-22 (food-drink-tobacco) and 23 (textiles) was certainly of the kind which is accompanied by relatively low ratios of imported inputs. That in branches 27-28 (paper-printing) and 29-32 (chemicals and allied products) was a liitle less so. When it became necessary though to channel increased savings (both local and foreign) at the expense of consumption to heavy industry the heavier import content of such capital investment became apparent. Whether this higher import content actually had any bearing on the decision of the firms to opt for exports rather than import substitution is something that can not be supported by the available evidence, but this bias in the foreign-financed sector for export-creation particularly in the case of very large concerns which were able to obtain concessionary contracts could perhaps be explained in terms of the existing legislative tax concessions of L.D. 2687/1953 (clause 25), which granted to companies or industries "whose activities save the state considerable amounts of foreign exchange each year" preferential treatment (also see clause 24). It is likely that the most tangible form of "foreign exchange saved" each year is that directly imported by the sale of the produce of such foreign concerns abroad. This interpretation may not exactly cover the true negotiating position of the firms, so that alternatively one could perhaps look not simply at the changes at an interindustry level, but at the changes in the composition of output at an intraindustry level for some clues as to the export capacity of foreign concerns. If the companies produce commodities representing various stages of intermediate processing as well as final goods, then exports constitute of goods of a different stage of processing than imports,(1) as perhaps has been the case with the aforementioned aluminium exports and imports, and in this case such foreign concerns which are unable for diseconomies of scale to diversify their products

(1) G.M. Radhu : "The Rate Structure of Indirect Taxes in Pakistan", Pakistan Development Review, Vol. IV, No. 3, Autumn 1964, p. 548.

and sell the final-stage product in Greece have no choice but to export what quantities of intemediate-range products can not be absorbed by the Greek market.

It is also possible that at this level of aggregation the degree of vertical integration in the industry is distorting the relative balance of the ratios we are examining, since intermediate products within integrated firms are not indicated in the value-added statistics. In other words import substitution involves a reduction in the import content of total absorption of goods and an increase in the ratio of domestic value-added to total aborption, unless there is a systematic relation between import substitution and the intermediate products withing the vertically integrated system.

But one should be careful not to generalize, as in some cases like the petrol refineries of ESSO most of the increase in production was in fact channeled to the local market and rather little to exports. But again the increase in local demand for petrol products was much quicker than the one for say, aluminium, so that petrol refineries were perhaps conceived as an exclusively import substituting activity, with little spare capacity to provide for exports.

The demand for ships and shipbuilding facilities on the other hand can not give us a sure guide, as the market is subject to violent vagaries of fluctuations in freights and commodity prices internationally and the substantial Greek market of potential ship purchasers is certainly looking at the international markets for purchases of vessels at times of crisis ("on the cheap"), being therefore to a small extent only influenced by offers to place orders in time with Greek shipyards. All tax and other benefits are small compared with the bargains due to international fluctuations of ship prices.

Given the heavier import content of capital investment in heavy in-

dustries, it is important to note that the balance of payments effect of the foreign capital inflow is conditioned not simply by the direct effect of the inflow on the capital account and the indirect effects of export-creation and import-substitution resulting from the investment, but also and further by another indirect effect deriving from higher incomes and employment in the capital importing sector and the related sectors of the economy . This feedback effect that transcends the import substitution considerations and changes the relative profitability of foreign investment policies will be examined in some detail in the chapter which follows.

CHAPTER EIGHT

The Indirect Import Content of Foreign Investment

One reason why an input-output table is useful in my further analysis is that in establishing the balance of payments effects of the foreign capital inflow by branch of the manufacturing industry both direct and indirect requirements of investment have to be assessed and two things are necessary for this : an input-output table and a vector of direct capital coefficients.

I have mentioned in the previous chapter that one could obtain a new matrix multiplying each row of the inverse by M_i / Z_i . Ideally one would like to have a new matrix derived for each year by use of new M_i and Z_i values, so that in the end different (changing) matrixes of import coefficients for each year could be derived. The column coefficient $\sum_{i=1}^{m} Z_i$ would then be the total import coefficient reflecting in each case the changing participation of imports in total supply and the changing structure of interindustry relations over time. It would then be simple from incremental capital-output ratios to calculate the increase in value-added by branch and year and then obtaining estimates of the relative increase in final demand to get the total annual import requirements of foreign investment.

A number of considerable difficulties nevertheless arise, some theoretical and some related to the statistical implementation of the model. The former are connected with the use of capital-output ratios and the latter with the calculation of the changing structure of the input-output table over time.

The use of capital-output ratios to indicate which sectors give the largest returns on scarce capital,(1) or to calculate in each case the capital requirements(2) and the rate of turnover as an investment

(1) Howard S. Ellis and Associates : Op.cit., pp. 63-64.
(2) Andreas G. Papandreou : A Strategy for Greek Economic Development, Center of Planning and Economic Research, Athens, 1964.

criterion has adequately been discussed in theory.(1) It has been shown that minimisation of the capital/output ratio is not always consistent with optimal choice i.e. the allocation which maximises the Social Marginal Product.(2) The latter again is not always an adequate criterion for the selection of investment projects.(3) What capital/output ratios as direct coefficients do provide us is information about production possibilities, with capital as a scarce factor (scarce resource) so as to obtain an estimate of the amount of investment required per unit of production in each sector. Production for final use depends on intermediate inputs and on the final product itself, and a vector of direct capital coefficients is useful in calculating total capital and total direct and indirect import requirements.(4)

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(1) For an exposition also see
G.C. Archibald : Op.cit., No.16, p.20 ff., incl. bibliography.
Norman S. Buchanan : International Investment and Domestic Welfare, H. Holt, New York, 1955.
J.J. Polak : "Balance of Payments Problems of Countries Reconstructing with the Help of Foreign Loans", Quarterly Journal of Economics, February 1943.

(2) Alfred E. Kahn : "Investment Criteria and Development Programs", Quarterly Journal of Economics, LXV, No. 1, February 1951.

(3) Population growth, technical skills and constraints in technology are also associated to the choice of investment projects. See : Harvey Leibenstein : Economic Backwardness and Economic Growth, J. Wiley and Sons, New York, 1957.
Walter Galenson and Harvey Leibenstein : "Investment Criteria, Productivity, and Economic Development", Quarterly Journal of Economics, LXIX, No. 3, August 1955.
Otto Eckstein : "Investment Criteria for Economic Development and the Theory of International Welfare Economics", Ibid, LXXI, No. 1, February 1957.

(4) The use of fixed factor proportions inherent in this kind of formulation is based on a number of restrictive assumptions, such as that relative input price changes cause very little substitution of one input for another, that there is little excess capacity within the industry, that technical change and innovation do not change the input structure of the industry, and that there are no significant economies or diseconomies of scale. For a critique see :
B. Van Arkadie and Ch. R. Franck : Economic Accounting and Development Planning, Oxford University Press, London, 1966, pp. 86-87.

Calculating the overall investment coefficient in the form of incremental capital/output ratios I compute the ratios of the sums of four consecutive annual investment flows to four-year changes in production for each sector j, with an annual time-lag between investment outlays and production increases in each sector. Therefore the vectors of direct capital coefficients are computed by obtaining several incremental ratios C_{it} from

$$C_{it} = \frac{\sum_{t-4}^{t-1} I}{Y_t - Y_{t-4}}$$

and then deriving an average

$$\bar{C}_i = \frac{1}{n} \sum_{i=1}^{n} C_{it}$$

The method is widely used,(1) sometimes using incremental capital/gross production ratios instead. The object of the moving-average technique is to smooth out cycles in capacity utilisation.(2) A range of different investment-output lags could be tried out, but it is generally difficult to obtain background information on which to base our assumptions. Additionally it has been suggested that for longer lags we could expect to obtain lower incremental capital-gross production (or output) ratios.(3)

A much more important problem is whether the use of moving averages itself in the estimating procedure has any effect on the values of the coefficients irrespective of the lags employed. Archibald has shown that at the (high) level of aggregation he is using it appears that use of moving averages has biased the coefficients downward.(4) This problem is linked to another one which emerges from a survey of Nugent's findings, namely whether to use

(1) Also see : A.G. Papandreou : A Strategy for Greek Economic Development, Center of Economic Research, Athens, 1962, pp.133-41.
(2) See Note under Table XXXVII for comments on this assumption.
(3) J.B. Nugent: Op. cit., p. 65, Note 1.
(4) G.C. Archibald: Op. cit., p. 38 ff.

investment outlays ignoring depreciation, or to assume that the four-year capital stock estimate in each case will be depreciated at some appropriate rate. The usual practice makes use of undepreciated incremental fixed capital and this I use in the present context.

The choice of a time unit in relation to the use of lags or moving averages introduces the notion of the "speed of adjustment" in the formulation of the acceleration principle as applied to cyclical fluctuations in production. The time path of aggregate output could be explosive or damped and this can be critically determined by the acceleration coefficient and the choice of the time unit.(1) The bias in the coefficients observed by Archibald and Nugent could be the result of just such a choice of time units and it could be changed if several other possibilities within the range could be empirically tried out.

The use of incremental fixed capital whether depreciated or undepreciated brings about the question of adoption of capacity estimates. We may now distinguish two versions of the acceleration principle as applied to cyclical fluctuations in production : the "strong version" and the "modified version". The "strong version" implies a fixed ratio of capital stock to output holding continuously with investment varying directly and propotionally with the rate of change of output. Excess capacity is ignored and investment and disinvestment are treated symmetrically. This assumption again implies in turn that in rapidly growing sectors (like those in the Greek manufacturing industry) disinvestment occurs during the contraction period when it is likely that the accelerator is inoperative in the downward direction. The "modified version" relaxes the assumption that a fixed ratio of capital to output applies at all times, so that the operation of the accelera-

(1) Franco Modigliani: "Comment on Capacity and the Acceleration Principle", Problems of Capital Formation, Studies in Income and Wealth, Vol. 19, Princeton University Press, 1957, p. 457.
Franco Modigliani and Owen H. Sauerlender: "Economic Expectations and Plans of Firms in Relation to Short-Term Forecasting", Short Term Forecasting, Studies in Income and Wealth, Vol. 17, 1955, p.261.

tor is suspended during the early part of the upswing until unutilized capacity is brought into operation. The accelerator is operative in the later part of the upswing.(1)

But then excess capacity can also develop during the downswing when replacement drops to zero and disinvestment becomes a function of the depreciation rate rather than of the change in production.(2) However in the context of growing industries investment is generally positive even during contractions. This of course means that the rate of investment can not drop to zero and therefore disinvestment can not entirely become a function of the rate of depreciation.

To that extent the modified version is shown not to be applicable. But there are other reasons why the acceptance of the modified version could raise serious problems and use of capacity-adjusted estimates is not recommended in this context. It has as an example been observed that in a majority of growing industries the level of capacity can be expected to decrease more in periods of expansion than in periods of contraction.(3) This has certainly been so with many sectors of the Greek manufacturing industry in that period.

Another fact to be seriously considered is that in the years of "infancy" of an industry growth does not necessarily reflect the accelerator process, but rather the essentially progressive establishment of the industry, so that there is no acceleration-induced investment but only autonomous investment taking place.(4) If this could happen in a normal period of expansion then a fortiori one could expect it to occur in the period of initial establishment of the industry on an aggregate level.

In all those cases it was thought that the complications ari-

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(1) Bert G. Hickman: "Capacity, Capacity Utilization and the Acceleration Principle", Problems of Capital Formation. Studies in Income and Wealth. Vol. 19, Princeton University Press, 1957, p.432-33.
(2) J.R. Hicks: A Contribution to the Theory of the Trade Cycle. Oxford University Press, London, 1950.
(3) Bert G. Hickman: Op. cit., p. 426, p. 440.
(4) Franco Modigliani: Op.cit., p. 460.

TABLE XXXVII

Incremental Capital/Output Ratios

1 Year Lag
4 Year Cycle
No Depreciation
No Adjustm. for Unutil. Capacity

$$\frac{\sum_{t-1}^{t+3} I}{V.A._{t+4} - V.A._{t}}$$

V.A. = Value Added
I = Investment in Fixed Capital
$t, t+1, \ldots, t+4$ = time at annual intervals

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	
20-22	1017/1092 -	757/833 -	727/1127 -	735/922 -	930/630 -	1427/710 -	1564/155 -	1672/389 -	2224/352 -	2353/584 -	2612/1283 -	2705/1546 -	2503/2031 -	
	.9313	.9088	.6451	.7972	1.4762	2.0099	10.0903	4.2982	6.3182	4.0291	2.0359	1.7497	1.2324	1956-66 average: 3.152928
23	2149/232 -	1406/511 -	1104/598 -	768/604 -	799/671 -	916/133 -	944/479 -	980/354 -	1033/423 -	1000/737 -	1222/706 -	1551/1232 -	1778/997 -	
	9.2629	2.7515	1.8462	1.2715	1.1908	6.8872	1.9708	2.7684	2.4421	1.3569	1.7309	1.2589	1.7834	1955-66 average: 2.271550
24	34/198 -	31/166 -	31/492 -	30/549 -	31/479 -	78/214 -	108/178 -	175/82 -	219/-76 -	183/367 -	184/301 -	189/341 -	192/415 -	
	.1717	.1925	.0630	.0546	.0647	.3645	.6067	2.1341	*	.4986	.6113	.5543	.4627	1959-66 average: 0.747457 (excl. 1961)
25-26	133/31 -	112/141 -	84/248 -	69/336 -	112/349 -	144/290 -	172/301 -	219/254 -	190/239 -	169/298 -	191/379 -	305/432 -	405/453 -	
	4.2903	.7943	.3387	.2054	.3209	.4966	.5714	.8622	.7950	.5671	.5040	.7060	.8940	1960-66 average: 0.699957
27-28	442/83 -	356/132 -	278/184 -	246/143 -	247/223 -	276/200 -	264/177 -	285/230 -	357/226 -	358/320 -	560/339 -	589/373 -	684/481 -	
	5.3253	2.6970	1.5109	1.7203	1.1076	1.3800	1.4915	1.2391	1.5796	1.1188	1.6519	1.5791	1.4220	1954-66 average: 1.833007
29-32	1479/192 -	1446/234 -	1224/310 -	1026/359 -	1112/404 -	1055/640 -	1452/897 -	1456/762 -	1235/663 -	1360/665 -	1088/446 -	1070/1023 -	3048/1201 -	
	7.7031	6.1795	3.9484	2.8579	2.7525	1.6484	1.6187	1.9108	1.8627	2.0451	2.4395	1.0459	2.5379	1955-66 average: 2.570610
33	354/24 -	391/282 -	573/451 -	703/320 -	726/354 -	757/199 -	696/152 -	537/247 -	506/359 -	644/481 -	827/502 -	1135/837 -	1405/707 -	
	14.7500	1.3865	1.2705	2.1969	2.0508	3.8040	4.5789	2.1741	1.4095	1.3389	1.4210	1.3560	1.9873	1958-66 average: 2.235612
34	172/52 -	242/57 -	265/80 -	320/101 -	263/102 -	231/116 -	233/192 -	210/181 -	369/181 -	824/209 -	954/130 -	961/119 -	2578/677 -	
	3.3077	4.2456	3.3125	3.1683	2.5784	1.9914	1.2135	1.1602	2.0387	3.9426	7.3395	8.0756	3.8030	1963-66 average: 5.040673

TABLE XXXVII
(Continued)

35-37	$\frac{795}{410}$ =	$\frac{779}{396}$ =	$\frac{531}{464}$ =	$\frac{477}{409}$ =	$\frac{569}{555}$ =	$\frac{638}{551}$ =	$\frac{695}{761}$ =	$\frac{709}{905}$ =	$\frac{666}{825}$ =	$\frac{605}{806}$ =	$\frac{692}{1037}$ =	$\frac{924}{972}$ =	$\frac{1151}{1185}$ =	
	1.9390	1.9672	1.1444	1.1663	1.0252	1.1579	.9133	.7834	.8073	.7506	.6673	.9506	.9713	1954-66 average: 1.244831
38	$\frac{47}{120}$ =	$\frac{41}{143}$ =	$\frac{35}{166}$ =	$\frac{34}{79}$ =	$\frac{46}{97}$ =	$\frac{340}{114}$ =	$\frac{456}{164}$ =	$\frac{767}{315}$ =	$\frac{858}{346}$ =	$\frac{712}{374}$ =	$\frac{693}{369}$ =	$\frac{683}{266}$ =	$\frac{821}{214}$ =	
	.3917	.2867	.2108	.4304	.4742	2.9825	2.7805	2.4349	2.4798	1.9037	1.8780	2.5677	3.8364	1959-66 average: 2.607938
39	$\frac{346}{35}$ =	$\frac{296}{44}$ =	$\frac{268}{60}$ =	$\frac{74}{73}$ =	$\frac{578}{104}$ =	$\frac{283}{147}$ =	$\frac{275}{122}$ =	$\frac{243}{139}$ =	$\frac{118}{143}$ =	$\frac{109}{141}$ =	$\frac{86}{146}$ =	$\frac{70}{119}$ =	$\frac{103}{94}$ =	
	9.8857	6.7273	4.4667	1.0137	5.5577	1.9252	2.2541	1.7482	.8252	.7730	.5890	.5882	1.0957	1958-66 average: 1.706258

Note : The moving average technique can be expected to smooth out short term cycles in utilisation of capacity. This assumes that the incremental ratios are not dependent on the rate of change of the labour force. An early explanation along those lines of the semicyclical, upward then downward movement of the C/O ratio in the U.S. between 1880 and 1948 is given by Simon Kuznets in his introductory remarks to a study by Daniel Craemer,[1] where he indicates that savings in real costs (i.e. productivity increases) could be realised with respect to factors other than capital. But clearly with a production function of the form $Q = Ae^{rt}K^{a}L^{1-a}$ incremental capital requirements will not be obtained by constant coefficients, but will be functions of proportional changes in required output, so that in real fact C/O ratios do not only (as intended) smooth out cycles in capacity utilization, but also differences in incremental capital requirements caused by differences in the actual rate of growth of output. For given factor-inputs and elasticities of production, the residual factor depends on differences in the historical rate of growth of output, so that with higher residuals, lower incremental capital coefficients are obtained by assuming constancy and averaging.[2]

We note that our own use of C/O ratios is made on the grounds of convenience, as is the accepted practice. Also note that the incremental nature of the estimates greatly amplifies changes in the level of the ratios computed above.

In defense of the assumption of constancy in the C/O ratio it is claimed that even in the years covered by Craemer's study for the U.S.A. the data "indicate fairly conclusively the absence of any uniform, persistent trend (in the C/O ratios) such as characterises the output-per-worker and capital-per-worker ratios for very long periods. We can be reasonably confident, in the light of experience, that labour productivity and capital per worker will continue to move upward in the future. But there is little basis for expecting either an upward or downward trend in the C/O ratio over future decades".[3]

Another explanation relates the changes in the C/O ratio to changes in the structure of the capital stock in terms of machinery and plant, so that once a technologically determined limit is arrived in the increase (or decrease) of machinery relative to plant with additional units of either being constrained in their capacity operation, proportionately more is spot on the scarce investment component to redress a balance. The degree of mechanization then gradually reverts to an appropriate level and the C/O ratio is restored nearer the original level. This argument is related to the one given in the text, pp. 146-48 above, where it is explained why in the context of a developing economy it is difficult to use capital estimates adjusted for capacity utilization for the calculation of C/O ratios.

(1) Simon Kuznets: "Introduction", Daniel Craemer: Capital and Output Trends in Manufacturing Industry, 1880-1948, N.B.E.R., New York, 1955, pp. 5-10.

(2) B. Cameron: "The Marginal Capital/Output Ratio", The Economic Record, XXXV, No. 72, December 1959.
G.C. Archibald: Industrialisation etc., Op.cit., pp. 46-7.

(3) M. Frankel: British and American Manufacturing Productivity. A Comparison and Interpretation, Bur.Econ.&Bus.Res., Univ.of Illinois, Urbana, 1957, p.49.

sing in the operation of the modified model were such that the less sophisticated and more "elementary" strong-version was preferable, so unadjusted estimates of capital coefficients ignoring underutilisation of capacity were used and capital/output ratios were derived in the normal way. This overcomes one more rather important consideration with regards to capacity estimates. Namely, while such estimates of utilised capacity are substantially accurate, short term errors could be substantial with the change-in-capacity characteristics behaving in such an erratic fashion. Let alone that it is very difficult to define and much more so actually to measure the "economically desirable" as opposed to the "technologically optimum" rate of utilisation of capacity and use one rather than the other in the estimating procedure.(1)

The years I average out for a final capital/output ratio in Table XXXVII are those in each sector during which a foreign capital inflow had actually taken place. In a few instances one year's ratio was excluded in the estimate, as has been the practice elsewhere, for the years when the reliability of the data seemed a little doubful or there was evidence of exceptional underutilised capacity which was altogether untypical and unrepresentative.

The assumption inherent in my next step is that in the absence of information relating to the foreign-financed sector of the industry alone, we may apply the capital/output ratios for the entire economy to this foreign-financed part of it. The next step is then to calculate to what extent the increase in output following the inflow of foreign capital will induce an increase in imports. Any such increase in imports may be the result of the import content in terms of equipment etc. from abroad, or of the multiplier effects of this increase in investment (e.g. consumer-good imports, etc.), or of the increased input needs from abroad once the investment project has been constructed and contributes to extra domestic production. All such imports are reflected in the input-output structure and looking at the 1960 Table's import entries,

(1) Hollis B. Chenery: "Overcapacity and the Acceleration Principle", Econometrica, January 1952, p. 1 ff.

we see that if they are calculated (as the table methodology stipulates) as the same or similar to the jth sector's products and added to the domestic product to give the total supply of commodities of the jth sector, if therefore they are classified to the sector which would produce them as a principal product in their country of origin,(1) then the input-output table import estimates are in many cases different from my own, because my import estimates include freight, insurance and trade charges. All we know from the input-output methodology is that the value of imports does not include trade and transportation margins, which are included in the inputs of the jth sector from the transportation and trade sectors respectively. There is no detailed indication in the input-output methodology as to the detailed allocation of imports by sector, when I give in the Appendix to Chapter Six a detailed breakdown of my own classification undertaking. I have decided for the consistency of the input-output structure to attribute the difference to such cost margins and assume they were the same fraction of import value in previous and subsequent years.

The general approach I shall employ in my further analysis is based on the method devised by Leontief,(2) who employed the original basic matrix of interindustry relations together with the import and export ratios of a subsequent year. This allows me to test for the effects of a change in imports under the assumption that the structure of interindustry relations remains the same and indeed it is unknown if and how it changed as one only input-output table is available. In the case of the Greek economy this method would allow me to employ the 1960 input-output table to obtain total import coefficients not only for that year, but for any other years for which information exists as to the level of imports

(1) "Imports are distributed to users (final or intermediate) along with the domestic supply of the same (or similar) products". See: A. Koutsoyiannis and A. Ganas : Op.cit., p. 7.

(2) W. Leontief : "Factor Proportions and the Structure of American Trade: Further Theoretical and Empirical Analysis", R.Ec.Stud., XXXVIII, No.4, Nov.1956, p.386-407. Reprinted in W.Leontief : Input-Output Economics, Oxford University Press, New York, 1966, p. 100 ff., pp. 118, 120.

by sector.[1] In the absence of reliable information leading to a revision of the structural relationships of the table, the difference in the material composition over time of the Greek imports and their respective levels, would in such a case constitute the distinction between figures identified as being related to the year 1960 as opposed to any other previous or subsequent year. The other years would simply offer a different import structure to be tested against a background of unchanging internal structure. The use of the 1960 table with different import weights would then give us an indication of the extent to which year-to-year changes in the composition of the Greek foreign trade and changes in the growth of imports relative to the growth of local production (in terms of value added) are affecting the general results. Had complete input-output tables for more years been available with the corresponding import allocation, our purpose would of course have been served even more accurately. Changes in the interindustry relations would then also be taken into account.

But the first step is to derive the 1960 total import coefficients by calculating the proportion of imports in increases in total supply in each sector, as aggregated in our recalculated inverse. The proportion of imports is then given by the absolute increase in total supply due to the inflow of foreign capital (that part of total supply attributed directly to the inflow) times the import vector derived from tables XXXIX and XL. The absolute increase in total supply due to the inflow of foreign capital is found by dividing the foreign capital entries by the relevant capital/output ratios and multiplying this value-added increment by the (annually changing) Total Supply/Value Added ratio, also derived from table XXXIX.[2] It is easy then on the basis of those results to obtain a ratio to indicate the proportion of this total increase in imports due to foreign capital to the actual inflow for that year.

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(1) H. Chenery and P.G. Clark: Interindustry Economics, J. Wiley, New York, 1967, p. 244.

(2) On the methodology and procedure in a theoretical context see Oskar Lange: "The Output-Investment Ratio and Input-Output Analysis", Econometrica, XXVII, No. 2, April, 1960.

TABLE XXXVIII

Imports and Exports : Results of Classification by Producing Sector of Manufacturing Industry for the Years 1953-1954 , 1959-1960 , 1965-1966
(In Drachmas , at Current Prices)

A. IMPORTS

	1953	1954	1959	1960	1965	1966
20-22 :	Food-Drink-Tobacco					
	608 448 109	513 009 291	957 992 300	860 765 523	1 805 464 161	1 576 819 617
23 :	Textiles					
	780 800 335	1 213 312 980	1 155 779 428	1 418 508 607	2 498 228 172	2 315 803 789
24 :	Clothing-Footwear					
	13 331 250	27 374 491	27 934 453	33 600 531	56 564 719	71 764 547
25-26 :	Wood-Cork-Furniture					
	239 696 308	377 196 301	475 621 106	547 808 304	1 083 958 781	1 295 808 060
27-28 :	Paper-Printing					
	206 939 313	340 824 480	472 527 671	499 597 834	996 599 759	1 051 400 971
29-32 :	Leather-Rubber-Plastics-Chemicals-Petrol					
	1 699 333 467	2 587 339 908	2 667 394 246	2 773 688 894	5 566 080 985	5 501 715 291
33 :	Non-Metallic Minerals					
	74 132 204	117 818 547	224 353 351	255 430 [illegible]85	528 510 348	545 644 262
34 :	Basic Metal Industries					
	350 613 395	581 742 635	1 064 503 872	1 274 987 085	2 133 442 677	2 075 679 800
35-37 :	Metal Products - Machinery - Electrical Equipment					
	1 072 216 069	1 532 093 581	2 922 900 889	3 149 933 607	8 206 803 901	7 721 115 827
38 :	Transport Equipment					
	395 301 295	742 223 243	3 956 398 151	6 852 067 958	5 160 370 241	6 984 549 584
39 :	Miscellaneous Industries					
	89 614 473	186 263 007	235 418 415	329 877 706	549 678 952	791 423 374
20-39 :	Total Manufacturing Industry					
	5 530 426 218	8 219 198 464	14 160 823 882	17 996 266 534	28 585 702 696	29 931 725 122

TABLE XXXVIII

Imports and Exports : Results of Classification by Producing Sector of Manufacturing Industry for the Years 1953-1954 , 1959-1960 , 1965-1966
(In Drachmas , at Current Prices)

A. IMPORTS

	1953	1954	1959	1960	1965	1966
20-22 :	Food-Drink-Tobacco					
	608 448 109	513 009 291	957 992 300	860 765 523	1 805 464 161	1 576 819 617
23 :	Textiles					
	780 800 335	1 213 312 980	1 155 779 428	1 418 508 607	2 498 228 172	2 315 803 789
24 :	Clothing-Footwear					
	13 331 250	27 374 491	27 934 453	33 600 531	56 564 719	71 764 547
25-26 :	Wood-Cork-Furniture					
	239 696 308	377 196 301	475 621 106	547 808 304	1 083 958 781	1 295 808 060
27-28 :	Paper-Printing					
	206 939 313	340 824 480	472 527 671	499 597 834	996 599 759	1 051 400 971
29-32 :	Leather-Rubber-Plastics-Chemicals-Petrol					
	1 699 333 467	2 587 339 908	2 667 394 246	2 773 688 894	5 566 080 985	5 501 715 291
33 :	Non-Metallic Minerals					
	74 132 204	117 818 547	224 353 351	255 430 [illegible]85	528 510 348	545 644 262
34 :	Basic Metal Industries					
	350 613 395	581 742 635	1 064 503 872	1 274 987 085	2 133 442 677	2 075 679 800
35-37 :	Metal Products - Machinery - Electrical Equipment					
	1 072 216 069	1 532 093 581	2 922 900 889	3 149 933 607	8 206 803 901	7 721 115 827
38 :	Transport Equipment					
	395 301 295	742 223 243	3 956 398 151	6 852 067 958	5 160 370 241	6 984 549 584
39 :	Miscellaneous Industries					
	89 614 473	186 263 007	235 418 415	329 877 706	549 678 952	791 423 374
20-39 :	Total Manufacturing Industry					
	5 530 426 218	8 219 198 464	14 160 823 882	17 996 266 534	28 585 702 696	29 931 725 122

TABLE XXXVIII (Continued)

B. EXPORTS

		1953	1954	1959	1960	1965	1966
21-22	Food-Drink-Tobacco	237 221 919	445 330 082	232 015 636	416 572 700	766 470 929	777 232 797
23	Textiles	226 742 639	230 657 526	835 011 765	660 905 027	872 511 627	1 282 280 719
24	Clothing-Footwear	4 466 928	1 757 117	8 244 714	13 320 901	41 541 925	107 920 854
25-26	Wood-Cork-Furniture	821 362	2 953 756	5 936 434	14 851 391	33 721 505	29 840 737
27-28	Paper-Printing	6 749 300	11 457 150	21 651 124	22 244 000	65 011 341	69 643 000
29-32	Leather-Rubber-Plastics-Chemicals-Petrol	39 919 668	60 141 071	236 758 136	338 844 353	496 930 597	695 929 161
33	Non-metallic Minerals	77 742 494	104 736 589	103 959 998	142 262 271	327 559 356	405 125 923
34	Basic Metal Industries	17 941 793	29 790 329	23 754 052	27 366 301	100 753 453	438 230 291
35-37	Metal Products - Machinery - Electrical Equipment	20 204 816	33 268 650	45 005 410	59 430 705	246 120 455	326 105 282
38	Transport Equipment	434 711	7 351 002	1 345 [illegible]	10 899 991	86 016 540	70 623 419
39	Miscellaneous Industries	2 226 240	3 647 447	7 655 734	5 352 808	22 262 783	41 576 911
20-39	Total Manufacturing Industry	634 462 150	931 113 779	1 526 349 659	1 712 059 518	3 059 725 547	4 296 527 094

Source : Derived from original disaggregated entries in National Statistical Service: Foreign Trade of Greece, various years.
For method of aggregation etc. see Appendix I, end of Chapter Six.

The choice of additional years on which the 1960 input output interindustry relations structure can be applied can only be dictated by the availability of import data and the need of policy considerations in relation to specific points in time. In view of the obvious weakness of the model, namely of the assumption of an unchanging interindustry relations structure, about which we shall make some further comments in the end of the chapter, it was decided to present the results of one year alone, 1966, although similar calculations were carried out for the years 1953-4, 1958-9 and 1965. The 1966 results give us some very useful hints about the changes in the import effects of foreign investment as compared with the year of the original calculation for 1960. The method of estimate for the level of imports which result from the foreign capital inflows is to calculate first at constant prices the imports (including import taxes etc.) by branch of the industry as per cent of value added. Imports by branch are from calculations in Chapter Six. Value added is taken from National Accounts estimates. On the basis of the import estimates as per cent of value added and the available value added figures I obtained new calculated values for final demand for all branches. The 1960 value-added figure remained the base for all years. To this in the year 1960 the observed imports were added (input-output specification). For the year 1966 (or any other) I adjusted the import estimates for costs etc. at the rate given by my own import estimate relative to the input-output (cost-adjusted) estimate. From those adjusted estimates of imports I obtained the imports/value added ratios for 1966. Use was made of adjusted imports together with National Accounts value added, as mentioned above, so as not to upset the consistency of the input-output table. The so obtained imports/value-added ratios I applied as per cent rates on the 1960 input-output value-added figures to obtain proportionately adjusted alternative import estimates for 1966 in a system where the 1960 value-added is assumed to remain the same (in drachma terms) in 1966 : the base on which to calculate proportional changes in the structure of import content of final supply (in other words in a sys-

TABLE XXXIX

Derivation of Total Supply and of the Proportion of Imports in Total Supply

1960 Estimates (given from input-output table)	20-22	23	24	25-26	27-28	29-32	33	34	35-37	38	39
M/V.A. Ratio	.2890	.4440	.0302	.3467	.3540	.7161	.2955	4.1701	1.3457	1.7729	1.0244
Adjusted for Import Taxes etc.	.44709	.68553	.04203	.45453	.66063	1.12720	.42051	4.75517	1.56414	2.05148	1.51221
Apply above shares on 1960 V.A. (in m. drachmas)	2 241	1 [illegible]	103	725	600	4 313	373	1 593	3 710	1 436	556
1960 Total Supply	33 675	13 070	8 473	5 086	3 241	18 194	2 926	3 977	9 800	3 312	1 490
Proportion of Imports in Total Supply (M incl. M taxes etc.)	.06656	.14216	.01216	.14255	.18513	.23706	.12748	.51771	.37563	.43357	.43350
Proportion of Imports in Total Supply (M excl. M taxes etc.)	.04306	.10444	.00673	.10373	.15520	.15050	.08008	.45401	.32269	.37470	.29705
1966 Estimates (calculated)											
M/V.A. Ratio	.3009	.4440	.0483	.4467	.5623	.7342	.2730	2.2467	1.6796	.6913	1.4924
Adjusted for Import Taxes etc.	.46505	.68553	.06723	.58564	.87074	1.15569	.38718	2.56191	1.95515	.79992	2.28307
Hypothetical $\overline{M}$ (apply above shares on 1960 V.A.). in m. dr.	2 327	1 [illegible]	165	934	609	4 422	343	859	4 647	550	956
Hypothetical Total Supply (substitute above $\overline{M}$ in 1960 T.S.)	33 761	13 070	8 535	5 295	3 250	18 303	2 896	2 342	10 927	2 436	1 796
Proportion of $\overline{M}$ on Hypothetical T.S. ($\overline{M}$ incl. taxes etc.)	.06893	.14216	.01933	.17639	.18738	.24160	.11844	.36635	.42521	.22958	.53229
Proportion of $\overline{M}$ on Hypothetical T.S. ($\overline{M}$ excl. taxes etc.)=$\overline{M}/\overline{\Xi}$	.04460	.10444	.01389	.13454	.15709	.15349	.08351	.32128	.36871	.19857	.36059

Note : M for the year 1966 (and other years) computed from disaggregated entries in National Statistical Service: Foreign Trade of Greece Yearbooks for the corresponding entries, as presented in Table XXXVIII.

Import taxes including import duties etc. assumed unchanged at the 1960 level, as given in the Input-Output Table.

The 1960 V.A. level plus the import level derived by applying the adjusted $\overline{M}/V.A.$ rates for 1966 on 1960 V.A. gives a hypothetical total direct supply estimate for 1966.

T.S. = Total Supply = Ξ (Greek letter Ksi). Subtracting the 1960 imports and adding the 1966 hypothetical imports we obtain a hypothetical level of T.S. (= $\overline{\Xi}$), adjusted for changes in imports, but retaining the same indirect demand structure.

tem where we say : "at the same level of value added as in 1960, in 1966 imports would amount to such and such level"). Final supply in this case is derived by adding the alternative import estimates to the 1960 intermediate demand and value added figures.

One should be very careful not to confuse the alternative import estimates (obtained by applying the true import/value-added ratios to the 1960 value added figure given by the input-output table) with the real level of imports (net of costs) in each branch. Nor is the total supply estimate in each case true in absolute values. The whole structure is only constructed to give us the 1960 absolute levels, adjusted for proportional changes in the import content over time. This allows us to obtain in each case estimates of imports (in the form of the readjusted 1960 import level as described above) as per cent of a hypothetical total supply, calculated not in absolute values but in the manner described above. So even if the figures are not the actual values, the import rates so calculated are meaningful. They denote the changing import content over time within an unchanging 1960 rest-of-the-economy structure. From the imports-as-per-cent-of-final-supply estimates I further derive an imports-net-of-import-taxes-etc. ratio to final supply. Both are given in Table XXXIX . The latter ratio assumes that as the rest of the structure is taken unchanging so the import taxes etc. are also taken at their 1960 rates. It would have been desirable to adjust the interindustry structure and the direct/indirect coefficient rates for changes over time as well, but as already described this would at least require a second input-output table which unfortunately is not available.

As it is we obtain a total import coefficient in the form $\sum_{j=1}^{m} \bar{Z}_{ij}$, where $\bar{Z}_{ij}$ are elements in a matrix, which is the transposed inverse of a table of coefficients (obtained for 1966 by multiplying the original input-output table, aggregated to our level of convenience, by the hypothetical total supply estimates from Table XXXIX) <u>times</u> a different $\bar{M}/\bar{Z}$ vector. The $\bar{M}/\bar{Z}$ ratios for agriculture, mining and services were derived in a method similar to that on Table XXXIX for

the manufacturing industry, the basic information deriving again from the National Accounts, the Foreign Trade statistics of the National Statistical Service and the 1960 input-output table. The construction and trade entries for the year 1966 were derived on the basis of information given for the corresponding sectors in the Nugent (revised Geronymakis) input-output table of the year 1961 and the National Accounts. Those estimates are found in Table XL below. Again we have to notice that the 1960 input-output table deviates from the National Accounts estimates. The input-output methodology compares the differences on pp. 55-59. I have indicated that I have adjusted my estimates to input-output specification for consistency (see pp. 149-50 above).

TABLE XL

Proportion of Imports in Total Supply

	Agriculture	Mining	Construction	Trade	Services
1960	.026205	.356392	.000000	.000000	.023300
1966	.031215	.316822	.002994	.012600	.040900

Source : Sources of data and methods given in the preceeding paragraph in the text.

The reason for selecting the year 1966 for an additional calculation of total import coefficients is that under assumptions this estimate could give us some valuable insight into the changing balance of payments effects of foreign investment and it is easy to see that the level of total imports is conditioned not simply by the total import coefficients, but by the capital/output ratios (small capital/output ratios, other things being equal result in higher total imports) and by the existence and the level of interindustry relations (a higher level of interindustry relations results in a higher level of indirectly motivated final imports). The import coefficients

TABLE XLI

Total Import Coefficients and Total Imports in Drachmas Deriving from the Import Vectors of Foreign Investment

(Values in Drachmas at Constant 1958 Prices)

	Foreign Investment	Share of Imports in Total Supply Incr.	Imports due to For. Capital Inflow	Proportion of Inflow-Induced Imports to For. Capital Inflow
	20-22			
1960	7 693 533	.110609	1 816 667	.2361
1966	12 401 567	.117041	4 052 222	.3524
	23			
1960	(no recorded inflow)			.4738 (1963 est.)
1966	14 143 408	.251189	6 665 084	.4711
	24			
1960	2 738 750	.124535	1 577 595	.5756
1966	11 372 540	.137202	7 275 303	.6397
	25-26			
1960	8 539 435	.017742	3 695 596	1.0000
1966	7 425 [illegible]	.240743	8 942 [illegible]	1.1737
	27-29			
1960	27 228 041	.206534	15 226 901	.5579
1966	4 541 819	.295943	2 625 091	.5777
	30-32			
1960	95 594 730	.[illegible]036	50 [illegible] 340	.5291
1966	317 931 000	.237577	170 173 501	.5352
	33			
1960	9 559 400	.[illegible]00433	2 954 531	.3091
1966	103 527 100	.203951	58 941 535	.2964
	34			
1960	(no recorded inflow)			1.3867 (1961 est.)
1966	153 558 100	.620043	114 946 631	.7485
	35-37			
1960	19 325 625	.336614	41 792 661	2.1295
1966	34 333 000	.340993	81 530 521	3.3747

TABLE XLI (Continued)

	Foreign Investment	Share of Imports in Total Supply Incr.	Imports due to For. Capital Inflow	Proportion of Inflow-Induced Imports to For. Capital Inflow
	30			
1960	169 774 000	.553013	201 136 000	1.1847
1966	(no recorded inflow)			.4859 (1965 est.)
	29			
1960	103 495	.393713	344 707	.7054
1966	(no recorded inflow)			.9590 (1965 est.)

Note : For the years where no foreign capital inflow has taken place, the nearest year's calculation is given instead, computed with the same assumptions and data from the same sources as those employed for the years 1960 and 1966.

themselves in the form $\sum_{i=1}^{m} \bar{Z}_{ij}$ (where $\bar{Z}_{ij}$ are as described elements in the inverse of the matrix of coefficients multiplied by $\bar{M}_i / \bar{Z}_i$, the proportion of imports in total supply to give the matrix of import coefficients) are also instrumental in determining the level of final total imports in drachmas. The influence of the import coefficients, nevertheless, is not determined by a rise in imports in this one branch alone. In fact the level or the rise in the level of imports in this branch may have little to do with the overall import coefficient in an industry with high backward linkage effects, particularly if those linkages are high with industries which themselves have a high import content. In this latter case the indirect effect through changes in imports of other branches will have a larger effect in determining the level of the total import coefficients. Some of the data and results are given in Tables XL and XLI .

The accuracy of those estimates as already mentioned would of course have been even higher had statistical information allowed the relaxation of the two for the time being intractable problems : a) of distributing imports by branch (by user) and b) of the unavailability of an additional input-output table of a later date to allow for estimates of the change in the structural interrelationships between industries over time. The estimates for the year 1960 do not have this second problem, but the estimates for other years should be viewed with caution. Although the indicated levels are thought to be substantially correct they can only be treated as helpful hints in the absence of more concrete information. Such alternative solutions under this kind of assumptions are obviously going some way towards establishing a basis for comparisons at the industry level. To this effect the results of the year 1966 (in addition to those of 1960) would suffice and in view of the reservations concerning the method publication of the results for all intermediate years is not warranted.

The usefulness of this approach lies not with the notion that investments with the higher import content should be discouraged. This may be far from the case : it is a planning problem to be solved in quite a wider context. What my estimates give us is an understanding of the constraints in the form of foreign exchange requirements related to alternative investment programmes. In this context we observe that the food-drink-tobacco industries (20-22) have the lowest induced-import content of investment of all industries, followed by the metallic minerals (clay, glass, porcelain, gypsum, asbestos, cement, etc. - ISIC Code 33). The highest import content on the other hand is in the metal products-machinery-electr. equipment group (35-37). Basic metal industries (34) were also high, but with a considerable drop in 1966, which closely follows the previously discerned import substitution evidence. This is the largest variation in any single industry. 1961 estimates were developed in this case in the absense of foreign investment inflow for the year 1960. Similar assumptions and data were used for this case as for the 1960 and 1966 estimates. Clothing-footwear (24) and wood-cork-furniture industries (25-26) show an increasing trend. So do industries in the 35-37 group. Transport equipment shows a steep decrease which is partly attributed to external conditions.

It is obvious from this analysis that imports, and particularly non-capital imports have been for the entire industry an important substitute for domestic capital as well as for current outputs. Imports have an input of capital in terms of foreign exchange and an output of the commodity imported, where exports have an input of the commodity exported and an output of foreign exchange. The use of foreign capital therefore to ease the foreign exchange constaint on imports is conditioned by the parallel existence of side effects like import-substitution or export-creation, the proceeds of which would outweight the import surge following a foreign investment, particularly when the balance indicates an induced-import level exceeding the inflow of capital.

CHAPTER NINE

Measures of Production Inputs and Factor Shares in the Manufacturing Industry by Sector

A. Limitations of Available Data

The statistical information necessary for the calculation of consistent input series for the Greek manufacturing industry in the period under consideration is sadly deficient. The available information does not cover all kinds of inputs, the observations are not consecutive, and the reliability of the various sources of information is suspect as proved by the frequent revisions of published information. Obviously nothing can replace the accuracy of census material or approach the consistency of industrial surveys. However in the absence of consistent information for the entire period, this author was prepared to present his own estimates in agreement with the opinion that even where the required figures are not to be found in the usual sources, one has to create them wherever possible in approximately the way they should have been created in the first place.(1)

The attempt to estimate series of economic magnitudes of the past is not impossible, but is certainly lengthy, tiresome, and often leads to estimates with high limits of uncertainty.(2) In the interests of the highest possible reliability, and to lower those limits of uncertainty, a great number of sources sometimes too diverse to be mentioned individually were scrutinized for fragmentary information in the interests of better documentation of economic intelligence. Additional personal information was also gratefuly received by the courtesy of personnel in office, sometimes offering unpublished information as well on the methodology employed.

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(1) Robert M. Solow: "Investment and Technical Progress", K.J.Arrow and Assoc., Eds., Mathematical Models in the Social Sciences, Stanford Univ. Press, 1960, p.93, note 4.

(2) Kenneth J. Arrow: Statistical Requirements for Greek Economic Planning, Center of Planning and Economic Research, Lecture Series 18, Athens 1965, p.12.
T. Balogh: "Suggestions on a Closer Linkage of Statistics-Economics Research and Planning for an Integration of Greece with EEC", National Statistical Service Memorandum, Athens, Sept. 1968.

Such measures of production inputs and of income distribution are necessary for an evaluation of the "technology" of the industry, by which I mean the existing technical relations between output and the various production inputs. Knowledge of the "technology conditions" under which the sectors of the industry operate is of fundamental importance in planning economic policies for expansion.

Foreign investment is not only important in determining balance of payments policies but can also be viewed in connection with the "technological" considerations of production, as a factor-input important in their shaping. The next parts of this thesis consider the statistical requirements for the calculation of such production relationships in the manufacturing industry by sector, so that the foreign-capital factor could then be related to specific structures of production and technology.

Some of the measures I developed cover the entire period 1953-1966. It is unfortunate that lack of reliable statistical documentation prevents the calculation of such measures for the entire period in other cases. The choice of a production function as a framework of our inquiry was then by necessity dictated by the availability of data.

The results are not presented under the light of infallibility, but rather as another "measure of our ignorance" within the institutional deficiencies that often hinder our advancement. It remains this author's conviction, nevertheless, that the end outcome is the nearest approximation to the correct figures as far as available information and economic insight allows.

B. An Estimate of Gross Fixed Capital Formation

I. The statistical data necessary for the calculation of consistent investment time series by branch of the manufacturing industry have been collected from a number of sources. Two periods are investigated. The period 1961-1966 with 1963 as a base year and the period prior to 1961. Entries for the year 1963, 1962 and 1961 are given by the Annual Industrial Survey for the year 1963, published by the National Statistical Service of Greece. Those estimates refer to large scale industries only (over 10 employees). (1) The available estimates of investment in small-scale industries (under 10 employees) cover the year 1963, alone (2) and need to be corrected as they are subject to sampling errors. The estimates only cover investment in machinery and implements, transport means, buildings, lots and sites. They expressly exclude investment in furniture and fixtures (hereafter F.F.). The correction for investment in F.F. in the small-scale industry (hereafter U_{10}) for the year 1963 was made on the assumption that investment in F.F. in U_{10} industries is proportionally the same as F.F. in large-scale industries (hereafter O_{10}). (3)

Column IV in Table XLIV gives the per cent share of O_{10} F.F., on the total O_{10} excluding F.F. Those per cent shares by branch of the industry applied on the given total U_{10} excluding F.F. (Col. VI in Table XLIV) provide an estimate of the O_{10} F.F. Total. U_{10} investment corrected for F.F., is given in Col. VII, Table XLIV.

Unfortunately the U_{10} estimates as given by the National Statistical Service for the year 1963 have a further drawback, namely that they include the value of purchases not only of new items plus

(1) National Statistical Service of Greece: Annual Industrial Survey for the year 1963, L:16 Industry etc., Athens, 1967, pp. 120-131.

(2) Ibid: p. 32.

(3) Ibid: pp. 128-9. Compute Column A as proportion of Column Z .

imports of used items from abroad (Category A'),[1] but also the value of purchases of used items from home (Category B').[2] Those purchases of used items increase the investment of any given single industry, but on an aggregate national level all such transactions obviously cancel out as what is investment for the purchasing form is de-investment for the selling, and from the systematic point of view all such transactions are excluded from the national account estimates. For the $^{O}10$ industries, care has been taken to exclude all purchases of such used items and other countersales and reversals (Cat. B') from our final $^{O}10$ estimates.[3] To make a similar correction for the 1963 $^{U}10$ we calculate the per cent share of such purchases of used items (Cat. B') on the total of investment expenditure including new (Cat. A') and used (Cat. B') items in $^{O}10$ industries in our Col. IX, Table XLIV. Col. X gives an estimate of $^{U}10$ used item shares (Col. IX) as applied on the total $^{U}10$ corrected for F.F. (Col. VII). In fact, care has been taken to make our correction for F.F. in the first instance (and calculate the per cent shares) on the basis of entries including both new (Cat. A') and used (Cat B') items in the $^{O}10$ sample, so that Col. VII, Table XLIV gives in fact the total $^{U}10$ for both A' and B' Categories.

From the (revised) National Accounts of Greece, 1948 - 1970, National Accounts Division, National Statistical Service (hereafter N.A.), we have annual total gross fixed capital formation figures for manufacturing (including all small and large establishments).[4] Subtract-

(1) Ibid: p.128-9, Entries under A'
(2) Ibid: p.128-9, Entries under B'
(3) The Survey lists under A' the purchases and imports from abroad of new items, under B' the purchases of used items from home, and under Γ' other sales and counter-entries, in its horizontal breakdown. It also(somewhat confusingly) lists under A, B, Γ, in a vertical breakdown the capital formation by type of establishments, where Category A are productive units, B auxiliary units, and Γ state and other public institutions. We always refer to the first breakdown in our Category A' and B' distribution.
(4) N.S.S.G.: National Accounts. Op.cit., pp. 110-11.

TABLE XLII

Calculation of Gross Capital Formation : 1961

In Thousand Drachmas - Current Prices

	I 1961 0_{10} Cat. A+B' 0_{10} New plus Used Investment Items	II 1961 0_{10} F.F. Cat. A' + B'	III I minus II: 0_{10} Cat. A+B' Excluding F.F.	IV II as % of III: F.F. as % of Total 0_{10}	IVa 1963 U_{10} Excl. F.F. as % of 1963 0_{10} Cat. A'+B' Excl. F.F.
20-22	832,171	21,748	810,423	2.68%	44.78%
23	316,128	5,807	310,321	1.87%	9.25%
24	33,298	2,706	30,592	8.84%	127.44%
25-26	32,932	1,182	31,950	3.72%	63.16%
27-28	153,869	2,780	151,089	1.84%	17.89%
29-32	199,251	8,313	190,938	4.35%	13.61%
33	132,802	2,127	130,675	1.63%	14.33%
34	215,141	950	214,191	0.44%	0.00%
35-37	157,626	5,679	151,947	3.74%	37.71%
38	78,147	4,899	73,248	6.69%	82.68%
39	7,055	371	6,684	5.55%	85.96%

	V IVa applied on III 1961 U_{10} A+B' Excluding F.F.	VI IV applied on V 1961 F.F. Cat. A' + B'	VII Total U_{10} Cat. A' + B' Corrected for F.F.	VIII 1961 0_{10} Cat.B': Used Items Only	IX VIII as % of I: 0_{10} Cat.B' as % of Total 0_{10}
20-22	362,907	9,726	372,633	22,589	2.71%
23	28,705	537	29,242	12,622	3.99%
24	38,986	3,446	42,432	1,390	4.17%
25-26	20,053	746	20,799	2,170	6.59%
27-28	27,030	497	27,527	2,001	1.30%
29-32	25,987	1,130	27,117	21,449	10.76%
33	18,726	305	19,031	7,428	5.59%
34	-	-	-	-	-
35-37	57,299	2,143	59,442	4,223	2.68%
38	60,561	4,051	64,612	1,284	1.64%
39	5,746	319	6,065	27	0.38%
			668,900	(:Calculated Total Incl. Used Items Cat.B')	
			-504,765	(:Given N.A. Total Excl. Used Items)	
			164.135	(:Used Items Cat.B' as Residual)	

	X IX applied on VIII: 0_{10} Cat.B' shares Applied U_{10} A+B'	XI As % of Total X: Hypothetical U_{10} Cat. B' Share	XII XI applied on Residual in VII: U_{10} Cat. B' Breakdown	XIII VII minus XII: 1961 U_{10} Cat.A'	XIV 1961 0_{10} Cat.A'	XV XIII + XIV: 1961 $U_{10}+U_{10}$ Cat. A'
20-22	10,098	47.14%	77,365	295,268	809,582	1,104,850
23	1,167	5.45%	8,944	20,298	303,506	323,804
24	1,769	8.26%	13,556	28,876	31,908	60,784
25-26	1,371	6.40%	10,504	10,295	30,761	41,056
27-28	358	1.67%	2,741	24,786	151,868	176,654
29-32	2,918	13.62%	22,353	4,764	177,802	182,566
33	1,064	4.97%	8,156	10,875	125,374	136,249
34	-	-	-	-	215,141	215,141
35-37	1,593	7.44%	12,211	47,231	153,403	200,634
38	1,050	4.95%	8,124	56,488	76,863	133,351
39	23	0.11%	181	5,884	7,028	12,912
	21,421		164,135	504,765	2,083,236	2,588,000

TABLE XLIII

Calculation of Gross Capital Formation : 1962

In Thousand Drachmas - Current Prices

	I 1962 0_{10} Cat. A+B' 0_{10} New plus Used Investment Items	II 1962 0_{10} F.F. Cat. A' + B'	III I minus II: 0_{10} Cat. A+B' Excluding F.F.	IV II as % of III: F.F. as % of Total 0_{10}	IVa 1963 U_{10} Excl. F.F. as % of 1963 0_{10} Cat. A+B' Excl. F.F.
20-22	761,500	22,570	738,930	3.05%	44.78%
23	347,493	6,519	340,974	1.91%	9.25%
24	23,134	1,754	21,380	8.20%	127.44%
25-26	36,268	1,375	34,893	3.94%	63.16%
27-28	107,042	3,688	103,354	3.57%	17.89%
29-32	435,455	10,524	424,931	2.48%	13.61%
33	353,869	6,150	347,719	1.77%	14.33%
34	707,248	1,571	705,677	0.22%	0.00%
35-37	225,999	6,845	219,154	3.12%	37.71%
38	127,568	4,468	123,100	3.63%	82.68%
39	11,536	383	11,153	3.43%	85.96%

	V IVa applied on III 1962 U_{10} A+B' Excluding F.F.	VI IV applied on V 1962 F.F. Cat. A' + B'	VII Total U_{10} Cat. A' + B' Corrected for F.F.	VIII 1962 0_{10} Cat.B': Used Items Only	IX VIII as % of I: 0_{10} Cat.B' as % of Total 0_{10}	
20-23	330,893	10,092	340,985	21,053	2.76%	
23	31,540	602	32,142	13,622	3.92%	
24	27,247	2,234	29,481	1,4[illegible]	6.[illegible]%	
25-26	22,038	868	22,906	1,9[illegible]	4.30%	
27-28	18,490	660	19,150	9,609	2.10%*	Using '63 rate
29-32	57,833	1,434	59,267	9,384	2.15%	
33	49,828	882	50,710	13,477	3.81%	
34	-	-	-	-	-	
35-37	82,643	2,578	85,221	38,337	5.11%*	Using '63 rate
38	101,779	3,694	105,473	1,704	1.33%	
39	9,587	329	9,916	159	1.38%	
			755,251	(:Calculated Total Incl.Used Items Cat.B')		
			-392,212	(:Given N.A. Total Excl. Used Items)		
			363,039	(:Used Items Cat.B' as Residual)		

	X IX applied on VIII: 0_{10} Cat.B' shares Applied U_{10} A+B'	XI As % of Total X: Hypothetical U_{10} Cat. B' Share	XII XI applied on Residual in VII: U_{10} Cat. B' Breakdown	XIII VII minus XII: 1962 U_{10} Cat.A'	XIV 1962 0_{10} Cat.A'	XV XIII + XIV: 1962 $U_{10}+U_{10}$ Cat. A'
20-23	9,411	39.84%	144,635	196,350	740,447	936,797
23	1,260	5.33%	19,350	12,792	333,871	346,663
24	1,807	7.65%	27,771	1,710	21,716	23,426
25-26	985	4.17%	15,139	7,767	34,707	42,474
27-29	1,059	4.48%	16,264	2,886	37,433	100,319
29-32	1,274	5.39%	19,568	39,699	426,071	465,770
33	1,932	8.18%	29,697	21,013	340,392	361,405
34	-	-	-	-	707,248	707,248
35-37	4,355	18.44%	66,944	18,277	187,662	205,939
38	1,403	5.94%	21,565	83,908	125,864	209,772
39	136	0.58%	2,106	7,810	11,377	19,187
	23,622		363,039	392,212	3,026,788	3,419,000

TABLE XLIV

Calculation of Gross Capital Formation : 1963

In Thousand Drachmas - Current Prices

	I 1963 O_{10} Cat. A+B' O_{10} New plus Used Investment Items	II 1963 O_{10} F.F. Cat. A' + B'	III I minus II: O_{10} Cat. A+B' Excluding F.F.	IV II as % of III: F.F. as % of Total O_{10}
20-22	675,722	28,380	647,342	4.38%
23	578,087	8,517	569,570	1.50%
24	41,747	2,878	38,869	7.40%
25-26	65,834	2,236	63,598	3.52%
27-28	297,812	5,819	291,993	1.99%
29-32	384,443	11,018	373,425	2.95%
33	401,618	5,366	396,252	1.35%
34	248,304	1,825	246,479	0.74%
35-37	261,578	10,975	250,603	4.38%
38	93,664	7,586	86,078	8.81%
39	151,170	437	14,733	2.97%

	V 1963 U_{10} Excl. F.F.	VI IV applied on V 1963 F.F. Cat. A' + B'	VII Total U_{10} Cat. A' + B' Corrected for F.F.	VIII 1963 O_{10} Cat.B': Used Items Only	IX VIII as % of I: O_{10} Cat.B' as % of Total O_{10}
20-22	289,889	12,697	302,586	29,805	4.41%
23	52,714	791	53,505	18,824	3.26%
24	49,534	3,665	53,199	4,274	10.24%
25-26	40,171	1,414	41,585	4,804	7.30%
27-28	52,245	1,040	53,285	6,241	2.10%
29-32	50,815	1,499	52,314	12,473	3.24%
33	56,775	766	57,541	9,601	2.39%
34	13	-	13	-	-
35-37	94,511	4,140	98,651	13,357	5.11%
38	71,174	6,270	77,444	4,959	5.29%
39	12,665	376	13,041	300	1.98%
			803,164	(:Calculated Total Incl.Used Items Cat.B')	
			-549,659	(:Given N.A. Total Excl. Used Items)	
			253,505	(:Used Items Cat.B' as Residual)	

	X IX applied on VIII: O_{10} Cat.B' share Applied U_{10} A+B'	XI As % of Total X: Hypothetical U_{10} Cat. B' Share	XII XI applied on Residual in VII: U_{10} Cat. B' Breakdown	XIII VII minus XII: 1962 U_{10} Cat.A'	XIV 1963 O_{10} Cat.A'	XV XIII + XIV: 1963 $U_{10}+U_{10}$ Cat. A'
20-23	13,344	35.91%	91,043	211,543	645,917	857,460
23	1,744	4.69%	11,890	41,615	559,263	600,878
24	5,448	14.66%	37,167	16,032	37,473	53,505
25-26	3,036	8.17%	20,713	20,872	61,030	81,902
27-29	1,119	3.01%	7,632	45,653	291,571	337,224
29-32	1,695	4.56%	11,561	40,753	371,970	412,723
33	1,375	3.70%	9,381	48,160	392,017	440,177
34	-	-	-	13	248,304	248,317
35-37	5,041	13.57%	34,404	64,247	248,221	312,468
38	4,097	11.03%	27,965	49,479	88,705	138,184
39	258	0.69%	1,749	11,292	14,870	26,162
	37,157		253,505	549,659	2,959,341	3,509,000

TABLE XLV

Calculation of Gross Capital Formation : 1964

In Thousand Drachmas - Current Prices

	I 1964 O_{10} Cat. A+B' O_{10} New plus Used Investment Items	II 1962 O_{10} F.F. Cat. A' + B'	III I minus II: O_{10} Cat. A+B' Excluding F.F.	IV II as % of III: F.F. as % of Total O_{10}	IVa 1963 U_{10} Excl. F.F. as % of 1963 O_{10} Cat. A+B' Excl. F.F.
20-22	590,693	261,161	564,532	4.63%	44.78%
23	917,708	9,784	907,924	1.08%	9.25%
24	61,797	4,069	57,728	7.05%	127.44%
25-26	164,340	2,266	162,074	1.40%	63.16%
27-28	144,261	5,902	138,359	4.27%	17.89%
29-32	360,771	9,960	350,811	2.84%	13.61%
33	537,042	5,727	531,315	1.08%	14.33%
34	90,971	971	90,000	1.08%	0.00%
35-37	412,097	12,972	399,125	3.25%	37.71%
38	247,429	7,098	240,331	2.95%	82.68%
39	20,622	788	19,834	3.97%	85.96%

	V IVa applied on III 1964 U_{10} A+B' Excluding F.F.	VI IV applied on V 1964 F.F. Cat. A' + B'	VII Total U_{10} Cat A' + B' Corrected for F.F.	VIII 1964 O_{10} Cat.B': Used Items Only	IX VIII as % of I: O_{10} Cat.B' as % of Total O_{10}
20-22	252,842	11,707	264,549	43,318	7.33%	
23	83,983	907	84,890	179,585	3.72%*	1961-3 mean: 3.72%
24	73,569	5,187	78,756	2,050	3.32%	
25-26	102,366	1,433	103,799	2,829	1.72%	
27-28	24,752	1,057	25,809	4,761	3.30%	
29-32	47,745	1,356	49,101	20,309	5.63%	
33	76,137	822	76,959	11,692	2.18%	
34	-	-	-	-	-	
35-37	150,510	4,892	155,402	12,069	2.93%	
38	198,706	5,862	204,568	2,264	0.92%	
39	17,049	677	17,726	231	1.12%	
			1,061,559		(:Calculated Total Incl.Used Items Cat.B'.)	
			- 646,600		(:Given N.A. Total Excl. Used Items)	
			414,959		(:Used Items Cat.B' as Residual)	

	X IX applied on VIII: O_{10} Cat.B' share Applied U_{10} A+B'	XI As % of Total X: Hypothetical U_{10} Cat. B' Share	XII XI applied on Residual in VII: U_{10} Cat. B' Breakdown	XIII VII minus XIII: 1964 U_{10} Cat.A'	XIV 1964 O_{10} Cat.A'	XV XIII + XIV: 1964 $U_{10}+U_{10}$ Cat. A'
20-22	19,391	49.88%	206,981	57,568	547,375	604,943
23	3,158	8.12%	33,695	51,195	738,123	789,318
24	2,615	6.73%	27,927	50,829	59,474	110,303
25-26	1,785	4.59%	19,047	84,752	161,511	246,263
27-28	852	2.19%	9,088	16,721	139,500	156,221
29-32	2,764	7.11%	29,503	19,598	340,462	360,060
33	1,678	4.32%	17,926	59,033	525,350	584,383
34	-	-	-	90,971	90,971	90,971
35-37	4,553	11.71%	48,592	400,028	400,028	506,838
38	1,882	4.84%	20,084	245,165	245,165	429,649
39	199	0.51%	2,116	2,039	20,391	36,001
	38,877		414,959	646,600	3,268,350	3,914,950

TABLE XLV

Calculation of Gross Capital Formation : 1964

In Thousand Drachmas - Current Prices

	I 1964 O_{10} Cat. A+B' O_{10} New plus Used Investment Items	II 1962 O_{10} F.F. Cat. A' + B'	III I minus II: O_{10} Cat. A+B' Excluding F.F.	IV II as % of III: F.F. as % of Total O_{10}	IVa 1963 U_{10} Excl. F.F. as % of 1963 O_{10} Cat. A+B' Excl. F.F.
20-22	590,693	261,161	564,532	4.63%	44.78%
23	917,708	9,784	907,924	1.08%	9.25%
24	61,797	4,069	57,728	7.05%	127.44%
25-26	164,340	2,266	162,074	1.40%	63.16%
27-28	144,261	5,902	138,359	4.27%	17.89%
29-32	360,771	9,960	350,811	2.84%	13.61%
33	537,042	5,727	531,315	1.08%	14.33%
34	90,971	971	90,000	1.08%	0.00%
35-37	412,097	12,972	399,125	3.25%	37.71%
38	247,429	7,098	240,331	2.95%	82.68%
39	20,622	788	19,834	3.97%	85.96%

	V IVa applied on III 1964 U_{10} A+B' Excluding F.F.	VI IV applied on V 1964 F.F. Cat. A' + B'	VII Total U_{10} Cat A' + B' Corrected for F.F.	VIII 1964 O_{10} Cat.B': Used Items Only	IX VIII as % of I: O_{10} Cat.B' as % of Total O_{10}
20-22	252,842	11,707	264,549	43,318	7.33%
23	83,983	907	84,890	179,585	3.72% * 1961-3 mean: 3.72%
24	73,[illegible]69	5,[illegible]27	78,756	2,050	3.32%
25-26	102,366	1,433	103,799	2,829	1.72%
27-28	24,752	1,057	25,[illegible]09	4,761	3.30%
29-32	47,745	1,356	49,101	20,309	5.63%
33	76,137	822	76,959	11,692	2.18%
34	-	-	-	-	-
35-37	150,510	4,892	155,402	12,069	2.93%
38	198,706	5,862	204,568	2,264	0.92%
39	17,049	677	17,726	231	1.12%
			1,061,559	(:Calculated Total Incl.Used Items Cat.B')	
			- 646,600	(:Given N.A. Total Excl. Used Items)	
			414,959	(:Used Items Cat.B' as Residual)	

	X IX applied on VIII: O_{10} Cat.B' share Applied U_{10} A'+B'	XI As % of Total I: Hypothetical U_{10} Cat. B' Share	XII XI applied on Residual in VII: U_{10} Cat. B' Breakdown	XIII VII minus XIII: 1964 U_{10} Cat.A'	XIV 1964 O_{10} Cat.A'	XV XIII + XIV: 1964 $U_{10}+U_{10}$ Cat. A'
20-22	19,391	49.88%	206,981	57,568	547,375	604,943
23	3,158	8.12%	33,695	51,195	738,123	789,318
24	2,615	6.73%	27,927	50,829	59,474	110,303
25-26	1,785	4.59%	19,047	84,752	161,511	246,263
27-28	852	2.19%	9,088	16,721	139,500	156,221
29-32	2,764	7.11%	29,503	19,598	340,462	360,060
33	1,678	4.32%	17,926	59,033	525,350	584,383
34	-	-	-	90,971	90,971	90,971
35-37	4,553	11.71%	48,592	400,028	400,028	506,838
38	1,882	4.84%	20,084	245,165	245,165	429,649
39	199	0.51%	2,116	2,039	20,391	36,001
	38,877		414,959	646,600	3,268,350	3,914,950

TABLE XLVI

Calculation of Gross Capital Formation : 1965

In Thousand Drachmas - Current Prices

	I 1965 0_{10} Cat.A'+B' 0_{10} New plus Used Investment Items	II 1965 0_{10} F.F. Cat. A' + B'	III I minus II: 0_{10} Cat.A'+B' Excluding F.F.	IV II as % of III: F.F. as % of Total 0_{10}	IVa 1963 U_{10} Excl. F.F. as % of 1963 0_{10} Cat.A'+B' Excl. F.F.
20-22	823,932	30,414	793,518	3.83%	44.78%
23	718,532	14,185	704,347	2.01%	9.25%
24	45,250	3,292	41,958	7.85%	127.44%
25-26	144,934	1,806	143,128	1.26%	63.16%
27-28	292,984	5,419	287,565	1.88%	17.89%
29-32	2,889,180	17,408	2,871,772	0.16%	13.61%
33	496,882	5,111	491,771	1.04%	14.33%
34	2,450,048	10,327	2,439,721	0.42%	0.00%
35-37	433,517	14,050	419,467	3.35%	37.71%
38	197,419	6,722	190,697	3.52%	82.68%
39	33,345	1,264	32,081	3.94%	85.96%

	V IVa applied on III 1965 U_{10} A'+B' Excluding F.F.	VI IV applied on V 1965 F.F. Cat. A' + B'	VII Total U_{10} Cat. A' + B' Corrected for F.F.	VIII 1965 0_{10} Cat.B': Used Items Only	IX VIII as % of I: 0_{10} Cat.B' as % of Total 0_{10}
20-22	355,337	13,609	368,946	38,783	4.71%
23	65,152	1,310	66,462	82,620	3.72%* 1961-3 mean: 3.72%
24	53,471	4,197	57,668	2,185	4.83%
25-26	90,400	1,139	91,539	7,429	5.13%
27-28	51,445	967	52,412	4,992	1.70%
29-32	•	•	•	•	•
33	70,471	733	71,204	18,970	3.82%
34	-	-	-	1,366	0.01%
35-37	158,181	5,299	163,480	12,408	2.86%
38	157,668	5,550	163,218	2,264	1.15%
39	27,577	1,086	28,663	226	0.68%
			1,063,592	(:Calculated Total U_{10} Incl. Used Items, Excl. 29-32)	

	X IX applied on VIII: 0_{10} Cat.B' shares Applied U_{10} A'+B'	XI As % of Total X: Hypothetical U_{10} Cat. B' Share	XII XI applied on Residual in VII: U_{10} Cat. B' Breakdown	XIII VII minus XIII: 1965 U_{10} Cat.A'	XIV 1965 0_{10} Cat.A'	XV XIII + XIV: 1965 $U_{10}+U_{10}$ Cat. A'
20-22	17,377	46.10%	165,982	202,964	785,149	988,113
23	2,472	6.56%	23,619	42,843	635,912	678,755
24	2,785	7.39%	26,607	31,061	43,065	74,126
25-26	4,696	12.46%	44,862	46,677	137,505	184,182
27-28	891	2.36%	8,497	43,915	287,992	331,907
29-32	•	•	•	•	2,859,070	2,905,082
33	2,720	7.22%	25,995	45,209	477,912	523,121
34	-	-	-	-	2,448,682	2,448,682
35-37	4,676	12.41%	44,682	118,798	421,109	539,907
38	1,877	4.98%	17,930	145,288	195,155	340,443
39	195	0.52%	1,872	26,791	33,119	59,910
	37,689		360,047	703,545	8,324,670	9,074,227
				+46,012		
				749,557		

APPENDIX TO TABLE XLVI

Note: For derivation of 1965 column XII and XIII Totals.

Compute	1961-63 Total U_{10} Cat. A'. excl. 29-32 as % of Total O_{10} Cat. A'. excl. 29-32 and 34. Obtain 23.32%.
Apply	23.32% on 1965 Total O_{10} Cat. A'. excl. 29-32 and 34 = 3,016,818. Obtain 703,545.
Compute	1961-63 20-32 U_{10} as % of Total U_{10} excl. 29-32. Obtain 6.54%.
Apply	6.54% on 703,545. Obtain 46,011 = 29-32 estimate, col. XIII.
Add	703,545 + 46,012 = 749,557 = Total col. XIII = Total U_{10} Cat. A'.
Subtract	703,545 from Total Col. VII 1,063,592. Obtain 360,047 = Total Col. XII = U_{10} Cat. B'. Total.

TABLE XLVII

Calculation of Gross Capital Formation : 1966

In Thousand Drachmas - Current Prices

	I 1966 O_{10} Cat.A'+B' O_{10} New plus Used Investment Items	II 1966 O_{10} F.F. Cat. A' + B'	III I minus II: O_{10} Cat.A'+B' Excluding F.F.	IV II as % of III: F.F. as % of Total O_{10}	IVa 1966 U_{10} Excl. F.F. as % of 1963 O_{10} Cat.A'+B' Excl. F.F.
20-22	855,784	33,467	822,317	4.07%	44.78%
23	649,163	13,178	635,985	2.07%	9.25%
24	55,164	3,746	51,418	7.29%	127.44%
25-26	81,290	2,054	79,236	2.59%	63.16%
27-28	415,297	9,162	416,135	2.20%	17.89%
29-32	508,844	17,095	489,749	3.49%	13.61%
33	617,810	4,956	612,854	0.81%	14.33%
34	655,577	3,898	651,679	0.60%	0.00%
35-37	809,820	25,790	784,030	3.29%	37.71%
38	168,100	7,119	160,981	4.22%	82.68%
39	16,966	1,163	15,803	7.36%	85.96%

	V IVa applied on III 1966 U_{10} A'+B' Excluding F.F.	VI IV applied on V 1966 F.F. Cat. A' + B'	VII Total U_{10} Cat. A' + B' Corrected for F.F.	VIII 1966 O_{10} Cat.B': Used Items Only	IX VIII as % of I: O_{10} Cat.B' as % of Total O_{10}	
20-22	368,233	14,987	383,220	48,727	5.69%	
23	58,829	1,218	60,047	29,439	4.53%	
24	65,527	4,777	70,304	3,350	6.07%	
25-26	50,045	1,296	51,341	3,409	4.19%	
27-28	74,446	1,638	76,084	3,632	0.85%	
29-32	66,655	2,326	68,981	10,198	2.01%	
33	87,822	711	88,533	24,582	3.98%	
34	-	-	-	5,714	0.87%	
35-37	295,658	9,727	305,385	245,990	5.11%*	* Using 63 rate: 5.11%
38	133,099	5,617	138,716	1,409	0.84%	
39	13,584	1,000	14,584	79	0.47%	
			1,257,195	(:Calculated Total Incl. Used Items Cat.B'.)		
			- 727,388	(:Given N.A. Total Excl. Used Items)		
			529,807	(:Used Items Cat.B' as Residual)		

	X IX applied on VIII: O_{10} Cat.B' shares Applied U_{10} A'+B'	XI As % of Total X: Hypothetical U_{10} Cat. B' Share	XII XI applied on Residual in VII: U_{10} Cat.B' Breakdown	XIII VII minus XII: 1966 U_{10} Cat.A'	XIV 1966 O_{10} Cat.A'	XV XIII + XIV: 1966 $U_{10}+U_{10}$ Cat. A'
20-22	21,805	40.88%	216,585	166,635	807,059	973,692
23	2,720	5.10%	27,020	33,027	619,724	652,751
24	4,967	8.00%	42,385	27,919	51,814	79,733
25-26	2,151	4.03%	21,351	29,990	77,881	107,871
27-28	647	1.21%	6,411	69,673	421,665	491,338
29-32	1,387	2.60%	13,775	55,206	496,646	551,852
33	3,524	6.61%	35,020	53,513	593,228	646,741
34	-	-	-	-	659,863	659,863
35-37	15,605	29.26%	155,021	150,364	563,830	714,194
38	1,165	2.18%	11,550	127,166	166,691	293,857
39	69	0.13%	689	13,895	16,887	30,782
	53,340		529,807	727,388	4,475,286	5,202,674

ing the total Cat. A' (new items) investment in $^{O}10$ as given in the Annual Industrial Survey, 1963, from the National Accounts grand total we obtain a sum of 549,659 m. drachmas, indicating the total $^{U}10$ investment (net of used items) for the year 1963. The total Cat. A' + B' corrected for F.F. in our Col. VII, Table XLIV is 803,164. Subtracting 549,659 we obtain a difference of 253,505 m. dr., as a residual estimate of used items: a much higher figure proportionally than the one we obtained in our Col. X by applying the $^{O}10$ ratios for used items to $^{U}10$ investment. This indicates that small firms and handicraft industries rely on second-hand machinery, equipment, transport means, furniture and fixtures to a much higher degree than the large establishments.

Assuming this increased use of second-hand etc., of Cat B' items is even proportionally throughout the branches of the industry we apply the share of individual entries of Col. X on the total Col. X, as a per cent distribution given in Col. XI on the difference 253,505, to obtain the breakdown of Cat B' investments in $^{U}10$ industries. The results are given in Col. XII, Table XLIV. Subtracting Col. XII from Col. VII we obtain the $^{U}10$ estimates corrected now for used items as well as for F.F. Those estimates in Col. XIII added to the original estimates for $^{O}10$ Cat A' supplied by the 1963 Survey (Col. XIV) give us the total $^{O}10$ plus $^{U}10$ Cat A' by branch of the industry in Col. XV, adding up to a total of 3,509 th. dr., investment equal to the National Accounts total for the year 1963.

The 1961 and 1962 estimates were based on the $^{O}10$ estimates for those years included in the 1963 Survey. (1) The $^{U}10$ totals were obtained by subtracting the $^{O}10$ totals of the Survey from the $^{O}10$ + $^{U}10$ totals of the National Accounts. For the breakdown of those 1961 and 1962 $^{U}10$ totals by branch, the 1963 per cent rates estimates were

(1) Survey, Op.cit., p.120, p.124

used, for lack of other evidence, as in Col. IVa, to give $^{U}10$ as per cent of respective (by branch) $^{O}10$ excluding F.F. For greater consistency we applied the per cent shares of $^{U}10$ net of F.F. and made the correction for F.F. by using the respective 1961 and 1962 F.F. $^{O}10$ distribution rather than the 1963 one. This we indicate in Col. IV and VI of our 1961 and 1962 estimates in Tables XLII and XLIII. Also the correction for $^{U}10$ used items was made by use of the 1961 and 1962 $^{O}10$ used items entries respectively.

A much more important problem was the discrepancy between the findings of the Survey for the year 1965 and the N.A. entries for that year. In fact the Survey gives for the $^{O}10$ industry alone a figure far exceeding the N.A. estimate for the $^{O}10$ plus $^{U}10$ total. This would seem to suggest in the first instance a serious difference in the method of accounting, but upon scrutiny the difference was found to be mainly due to the huge imports of machinery and mechanical equipment in two sectors, chemical industries, and basic metal industries (in fact mainly imports for two large foreign investment ventures). Presumably the N.A. recorded the inflow of foreign capital as investment where the Survey recorded the purchase of equipment from the part of the two firms. Neither estimate gives the actual value of installed equipment, i.e. realised investment. This undoubtedly resulted in an overestimate of investment for the years 1964 and 1966 in the N.A. This in turn would result in a huge increase in $^{U}10$ residual investment estimate under the method we used for the 1961-63 period. To avoid this we proceed as follows. We retain unaltered as given by the Surveys the 1964-66 $^{O}10$ Cat A' investments. (1) We estimate the 1961-63 $^{U}10$ as per cent of $^{O}10$ (excluding branch 34) and derive a three-

(1) National Statistical Service: Annual Industrial Survey for the Year 1964. L:24 Industry etc., Athens, 1968, p.92.
Ibid. 1965. L:25 Industry etc., Athens, 1969, p.90.
Ibid. 1966. L:26 Industry etc., Athens, 1969, p.90.

year average which we apply to the 1964-66 $^{O}10$ minus branch 34 and obtain a measure of $^{U}10$ total. The reason for excluding branch 34 is that there was no $^{U}10$ investment undertaken in branch 34 during the period. The thus computed $^{U}10$ we subtract from Col. VII totals in our 1964-66 estimates to obtain a measure of used items included in the $^{U}10$ total in each year.

For the year 1965 an additional computation was made as the 1961-63 $^{U}10/^{O}10$ ratio should not include branch 29-32 estimates which given the $^{O}10$ magnitude would result in disproportionate total $^{U}10$ estimates. We derive instead the 1961-63 total $^{U}10$ Cat. A' + B' excluding 29-32 as per cent of the total $^{O}10$ Cat. A' + B' excluding 29-32 and 34 for the years 1961-63. This averages out at 23.32% which applied on the 1965 $^{O}10$ Cat. A' + B' (excluding 29-32 and 34) gives 703,545 th. dr. This in turn is the total 1965 $^{U}10$ Cat. A' + B' excluding 29-32. We then derive the 1961-63 29-32 $^{U}10$ Cat. A' + B' as per cent of total 1961-63 Cat. A' + B' $^{U}10$ excluding 29-32, which is 6.54%. This applied on 703,545, gives 46,011 th. dr. i.e. the computed 1965 29-32 $^{U}10$ Cat. A' + B' value. The total $^{O}10$ + $^{U}10$ estimate then amounts to 749,556 th. dr. The reason why those estimates differ from the N.A. aggregates is given in the previous paragraph.

The 1957-60 $^{O}10$ investment breakdown follows in the per cent by branch distribution of total investment the findings of the Annual Industrial Survey, (1) only that we apply the per cent shares of Sectors to Total to new revised N.A. total investment estimates. For the year 1957 the National Statistical Service per cent distribution as cited by Krengel was used and applied to the revised N.A. to-

(1) National Statistical Service: 1961 Annual Industrial Survey and Survey on Gross Investment for 1958-1960, Athens, 1963. Rolf Krengel and Dieter Martens: Fixed Capital Stock and Future Investment Requirements in Greek Manufacturing, Research Monograph Series, Center of Planning and Economic Research, Athens, 1966, p.62.

Calculation of Gross Capital Formation: 1957-60

In Million Drachmas - At Current Prices

		I Investment Shares Computed from Unpublished N.A. O_{10} Breakdown given by Krengel.	II I Applied on Revised Total O_{10} Estimates (1957 $O_{10}/O_{10} + U_{10}$ Share Applied on New N.A. $O_{10} + U_{10}$ Investment).	III O_{10} Establishments Share of $O_{10} + U_{10}$ Value - Added by Branch (For 1957 Apply 1958 % Shares).	IV Hypothetical $O_{10} + U_{10}$ Estimate by Branch: Value - Added as Weight (*Adjusted Downwards).	V Hypothetical U_{10} Estimates Corrected for C/O Ratios. (*Adjusted Downwards).	VI % Shares of Sectors to Total in V Applied on New Total U_{10} Estimate (i.e. on N.A. $O_{10} + U_{10}$ minus Col.II Total).	VII II plus VI: 1957 $O_{10} + U_{10}$ Total.
1957	20-22	22.14%	215	73.7%	292	58	169	390
	23	16.72%	162	89.1%	182	28	61	223
	24	0.11%	1	14.8%	7	6	6	7
	25-26	1.50%	16	24.4%	65	55	49	65
	27-28	6.92%	67	84.8%	79	18	12	79
	29-32	21.11%	204	78.0%	261	57	180	384
	33	12.57%	122	77.9%	157	10	26	148
	34	2.31%	22	100.0%	22	-	-	22
	35-37	10.84%	105	49.8%	211	49	112	217
	38	1.27%	12	57.3%	21	10	9	21
	39	4.50%	43	30.4%	62*	30*	96	139
			969			321	721	1,690

		I	II	III	IV	V	VI	VII
1958	20-22	27.26%	401	73.7%	544	108	170	571
	23	16.48%	243	89.1%	273	43	50	293
	24	0.56%	8	14.8%	54	46	46	54
	25-26	0.83%	12	24.4%	50	43	40	52
	27-28	3.75%	55	84.8%	74	29	19	74
	29-32	10.22%	150	78.0%	192	42	73	223
	33	8.14%	120	77.9%	154	9	12	132
	34	5.01%	74	100.0%	74	-	-	74
	35-37	9.46%	139	49.8%	279	64	76	215
	38	17.80%	262	57.3%	303*	137*	41	303
	39	0.49%	7	30.4%	23	25	16	23
			1,471			546	546	2,017

Calculation of Gross Capital Formation: 1957-60

In Million Drachmas - At Current Prices

		I Investment Shares Computed from Unpublished N.A. O_{10} Breakdown given by Krengel.	II I Applied on Revised Total O_{10} Estimates (1957 $O_{10}/O_{10} + U_{10}$ Share Applied on New N.A. $O_{10} + U_{10}$ Investment).	III O_{10} Establishments Share of $O_{10} + U_{10}$ Value - Added by Branch (For 1957 Apply 1958 % Shares).	IV Hypothetical $O_{10} + U_{10}$ Estimate by Branch: Value - Added as Weight (*Adjusted Downwards).	V Hypothetical U_{10} Estimates Corrected for C/O Ratios. (*Adjusted Downwards).	VI % Shares of Sectors to Total in V Applied on New Total U_{10} Estimate (i.e. on N.A. $O_{10} + U_{10}$ minus Col.II Total).	VII II plus VI: 1957 $O_{10} + U_{10}$ Total.
1959	20-22	22.73%	330	79.8%	413	63	96	426
	23	15.10%	219	92.2%	238	27	35	254
	24	0.42%	6	13.9%	43	37	37	43
	25-26	0.75%	11	26.5%	42	35	33	44
	27-28	3.44%	50	88.8%	56	9	6	56
	29-32	30.62%	444	80.4%	552	108	206	649
	33	9.81%	143	74.7%	191	13	20	163
	34	4.19%	61	100.0%	61	-	-	61
	35-37	6.29%	92	45.2%	204	51	72	164
	38	5.54%	80	58.0%	137	114	57	137
	39	1.09%	16	33.5%	47	50	31	47
			1,452			507	593	2,045

		I	II	III	IV	V	VI	VII
1960	20-22	20.55%	314	79.1%	402	63	86	400
	23	15.74%	240	89.7%	271	40	41	281
	24	0.73%	11	12.5%	88	77	76	87
	25-26	1.38%	21	29.3%	72	58	53	74
	27-28	5.76%	88	91.2%	98	14	9	97
	29-32	14.65%	224	77.0%	293	67	98	322
	33	8.09%	124	86.2%	145	6	8	132
	34	4.45%	68	100.0%	69	-	-	68
	35-37	6.70%	102	48.3%	216	51	55	157
	38	20.77%	317	64.2%	377*	92*	55	372
	39	1.17%	18	35.9%	50	50	31	49
			1,527			426	512	2,039

TABLE 1

Calculation of Gross Capital Formation. 1950-1956

In Million Drachmas - Current Prices

A. $^{O}_{10}$

	1950	1951	1952	1953	1954	1955	1956
20-22	116	106	88	108	54	208	216
23	348	211	231	121	153	180	199
24	2	2	2	2	3	4	3
25-26	8	9	7	7	9	3	6
27-28	49	59	40	47	39	54	61
29-32	113	166	195	184	240	160	259
33	23	10	61	80	90	191	272
34	14	13	12	53	96	50	83
35-37	55	135	68	72	120	74	107
38	4	3	4	5	6	4	7
39	33	27	29	44	43	37	58

B. $^{U}_{10}$

Method 1: Applying 2 year (1957-58) average $^{U}_{10}$% share by branch on total annual $^{U}_{10}$ values obtained as residual from total N. A. investment minus total $^{O}_{10}$ calculated as above.

Method 2: Applying $^{U}_{10}$% share on $^{O}_{10}$ by branch (2 year average) and reducing proportionally to given totals.

1950:	Method 1	Method 2	Medium	1951:	Method 1	Method 2	Medium
20-22	19	10	14		18	8	13
23	6	14	10		6	8	7
24	3	2	2		3	2	2
25-26	9	7	8		9	7	8
27-28	2	2	2		2	2	2
29-32	6	11	9		6	15	10
33	2	1	2		2	0	1
34	-	-	-		-	-	-
35-37	10	7	8		10	14	12
38	3	0	2		3	0	2
39	6	12	9		5	8	7

TABLE 1 (Continued)

1952:	Method 1	Method 2	Medium	1953:	Method 1	Method 2	Medium
20-22	18	7	13		18	8	13
23	6	9	8		5	5	5
24	3	2	2		3	2	2
25-26	9	6	7		9	6	7
27-28	2	2	2		2	2	4
29-32	6	18	13		6	16	11
33	2	2	2		2	2	2
34	-	-	-		-	-	-
35-37	10	8	9		10	8	9
38	3	0	1		3	0	1
39	5	10	7		5	14	9
	64	64	64		63	63	63

1954:	Method 1	Method 2	Medium	1955:	Method 1	Method 2	Medium
20-22	21	4	13		24	20	22
23	7	6	7		7	8	7
24	4	3	3		4	4	4
25-26	10	8	9		12	3	7
27-28	2	1	2		2	2	4
29-32	7	22	14		8	17	12
33	2	2	2		2	6	4
34	-	-	-		-	-	-
35-37	11	13	12		13	9	11
38	3	1	2		4	0	2
39	7	14	10		7	14	10
	74	74	74		83	83	83

1956:	Method 1	Method 2	Medium
20-22	28	20	24
23	11	9	10
24	6	3	5
25-26	17	6	11
27-28	3	3	3
29-32	11	27	19
33	3	8	5
34	-	-	-
35-37	18	14	16
38	5	1	3
39	11	22	17
	113	113	113

tals. The per cent share of $^{O}10$ to total investment remains in the ratio of the Survey findings to the N.A. estimates of the time, only the old per cent distribution is applied to the higher new N.A. estimates. Krengel gives some additional unpublished information of N.S.S. origin concerning the breakdown of 1957 $^{O}10$ investment, and this we use here. Since the Krengel-Martens' publication the National Account estimates have been revised twice, so we applied the 1957 per cent breakdown by sector as applied above for the years 1958-60 to new estimate of $^{O}10$ total, increased in proportion to the increase in the latest N.A. data on annual totals.

Krengel in the calculation of the $^{U}10$ investment distribution for the 1957-60 period used the distribution of value-added in $^{U}10$ industries as a weight.(1) This was thought as an unsatisfactory estimate and a new method was tried. The Krengel method assumes that $^{U}10$ firms operate under the same capital-output ratio as the $^{O}10$ firms. Evidence from the Industrial Survey of the year 1958 as published by the NSSG and cited by Coutsoumaris (2) suggests differences within branches of the industry which should be taken into account. So from the C/O ratios of firms grouped by size (sizes up to 9 employees, 10-19, 20-49, 50-99, 100-199, 200-499, 500 and over) and by branch of the industry, the $^{U}10$ C/O ratios were set against a weighted average of the C/O ratios of all $^{O}10$ firms. The evidence allows new estimates for all branches with the exception of branch 24 and 27-28 where for lack of statistical information the ratio for the total industry was applied. The hypothetical $^{U}10$ breakdown as calculated by use of value added as a weight is given in Col. IV Table IL and the calculation taking account of the C/O ratio yields considerable changes as shown in Col. V. The new per cent breakdown applied to the N.A. total $^{U}10$, obtained as residual by subtracting the

(1) Rolf Krengel and Dieter Martens: Op.cit., pp.66, 68, 69.
(2) George Coutsoumaris: Op.cit., p.427.

(revised) $^{O}10$ total from the total for the industry ($^{O}10 + {}^{U}10$) as given by the N.A. gives in Col. VI new $^{U}10$ estimates.

The 1950-56 breakdown for $^{O}10$ industries is given by the National Statistical Service and cited by Krengel.(1) The per cent distribution of investments was applied on the revised estimates as given by subsequent N.A. publications. The 1950-56 $^{U}10$ estimates by branch were first calculated by applying the 1957 and 1958 $^{U}10$ shares by branch of the industry on the total $^{U}10$ investment and then by obtaining a two-year average. This in turn was applied on our 1950-56 $^{O}10$ estimates in Method A' to obtain a breakdown as on Table L . It seemed reasonable in view of the weakness of our assumtion , to consider yet another indicator of investment distribution and another method (Method B') was adopted to obtain the 1957 and 1958 share of $^{U}10$ on $^{O}10$ by branch of the industry as a two-year average and derive the $^{U}10$ values from the $^{O}10$ branch estimates for each year. The results when reduced to given annual $^{U}10$ totals were different from the ones in Method A'. A third estimate I call the Medium Method as an average of Method A' and Method B' findings was finally preferred and it is this average estimate which is used for our final $^{U}10$ entries. (See Table L).

For the calculation of the 1948 and 1949 breakdown of $^{U}10 + {}^{O}10$ investment, capital equipment imports series were established (Table LI) so that some attributable kinds of imported investment goods were allocated to the relevant branches. Those estimates were regarded as giving some indication relative to developments in sector investment, as all the capital equipment of this period was actually imported from abroad, so that the investment shares (determined for total $^{O}10$ and $^{U}10$ investment) are conditioned by the behaviour of the capital imports indicator for the years 1948 and 1949

(1) R. Krengel and D. Mertens: Op.cit., p.23.

TABLE I.1

A. Calculation of Gross Fixed Capital Formation, 1948-1949

In Million Drachmas - Current Prices

	Capital Equipment Imports Index (1953 = 100)		Calculated Shares Reduced Proportionately to Given Totals (° = Small Upward Adjustment. No Import Data Available)	
	1948	1949	1948	1949
20-22	84.33%	164.12%	35	60
23	236.31%	375.28%	102	143
24	-	-	1°	1°
25-26	98.20%	104.48%	5	4
27-28	210.80%	303.86%	37	47
29-32	100.56%	104.14%	66	61
33	54.24%	63.89%	15	16
34	13.87%	33.66%	2	5
35-37	200.23%	164.15%	56	40
38	-	-	1°	1°
39	77.08%	336.46%	6	22
			326	400

B. Gross Fixed Capital Formation Breakdown, 1945-1947

In Million Drachmas - Constant 1958 Prices

	$O_{10} + U_{10}$ Investment Breakdown, 1948-1949		1948-1949 Average Shares: 2:1 Weight	$O_{10} + U_{10}$ Investment Breakdown, 1945-1947		
	1948	1949	1948-49	1945	1946	1947
20-22	10.73%	14.96%	11.46%	7	16	36
23	31.31%	35.76%	31.55%	19	45	100
24	0.27%	2.88%	0.30%	1	1	3
25-26	1.52%	9.59%	3.44%	2	5	11
27-28	11.36%	11.79%	11.15%	7	16	35
29-32	20.21%	15.24%	18.45%	11	26	59
33	4.65%	4.03%	4.37%	3	6	14
34	0.63%	1.25%	0.76%	-	1	2
35-37	17.17%	9.97%	14.96%	9	21	48
38	0.27%	0.29%	0.26%	-	-	1
39	1.88%	5.46%	2.70%	1	4	9
	100.00%	100.00%	100.00%			

TABLE L11

Investment $O_{10} + U_{10}$ Million Drachmas at Constant 1958 Prices

	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
20–22	7	16	36	120	156	334	274	229	180	74	244	237	375	571	381	345	927	700	640	438	725	695
23	19	45	100	350	373	919	501	542	187	176	199	206	218	293	227	242	271	260	449	571	498	466
24	1	1	3	3	3	10	9	9	6	7	9	8	7	54	39	75	51	18	40	80	54	57
25–26	2	5	11	17	10	41	39	32	21	20	11	17	64	52	39	64	35	31	61	178	135	77
27–28	7	16	35	127	123	131	140	95	76	45	62	63	77	74	50	84	149	75	252	113	244	351
29–32	11	26	59	226	159	313	405	472	289	280	183	274	375	223	580	278	154	348	308	260	2132	394
33	3	6	14	52	42	64	25	143	122	101	207	273	145	132	146	114	114	270	329	422	384	462
34		1	2	7	13	36	30	27	79	106	53	82	22	74	55	59	181	529	185	66	1798	471
35–37	9	21	48	192	104	162	338	175	120	146	90	121	212	215	147	135	169	154	234	367	396	510
38			1	3	3	15	12	11	9	9	6	10	21	303	122	321	112	157	103	311	250	210
39	1	4	9	21	57	108	78	82	78	58	50	74	136	23	42	42	11	14	19	26	44	22

as compared with that for 1950, 1951, 1952 and 1953. Setting the capital import index for the year 1953 = 100, and using the capitalequipment imports data in Bank of Greece: Report of the Governor, 1950-53, (1) we arrive at the breakdown as on Table LI, Part A, for the years 1948 and 1949.

For the years 1945, 1946 and 1947, the breakdown of total investment by branch was made on the basis of the 1948-49 per cent breakdown. It seemed reasonable in view of the rapidly changing structure to give a weight of two to one to the 1948 breakdown against the 1949 one. The greatest difficulty with those years has been the rapidly changing exchange rate because of the rampant inflation of that period, described in Chapter One. What seem to this author reasonable estimates in constant 1958 prices are not expressed at current prices because of the absence of reliable weights.

The pre-war and (negligible) war-time capital formation is taken from rather crude estimates made by Krengel,(2) although some adjustment would seem desirable in view of the war-time disinvestment, somewhat underestimated by the German authors.

II The method of allocating total $^{O}10 + {}^{U}10$ investment by major capital assets and the results obtained are now presented in some detail in terms of the relative composition of the investment outlays. For the period 1961-66 the distribution of $^{O}10$ investments is given by the Annual Industrial Surveys in five main categories.

Grouping together for our convenience and aggregating we obtain a breakdown in the terms of three main types of fixed assets: 1. Land & Buildings, 2. Transport Equipment, Furniture and Fittings, and 3. Mechanical Equipment. This allocation is useful for depre-

(1) Bank of Greece: Report of the Governor, 1950, Athens 1951, p.37. Ibid, 1951, Athens, 1952, p.47. Ibid, 1952, Athens, 1953, p.55. Ibid, 1953, Athens, 1954, p.61.

(2) Converted from constant 1954 to constant 1958 prices.

TABLE L111

Allocation of Gross Fixed Capital Investment : 1950 - 1966.

In Million Drachmas - Current Prices
(Constant 1958 Prices in Parenthesis)

	Land and Buildings			Transport Equipment Furniture & Fittings			Mechanical Equipment		
	O_{10}	U_{10}	Total	O_{10}	U_{10}	Total	O_{10}	U_{10}	Total
1950									
20-22	28	4	32 (82)	14	2	16 (41)	74	8	82 (211)
23	69	0	69 (178)	16	1	17 (44)	263	9	272 (697)
24	0	0	0 (0)	0	0	0 (0)	2	2	4 (10)
25-26	3	1	4 (11)	1	1	2 (3)	4	6	10 (26)
27-28	11	0	11 (28)	2	0	2 (5)	36	2	38 (98)
29-32	17	1	18 (46)	10	1	11 (28)	86	7	93 (239)
33	3	0	3 (8)	1	1	2 (5)	19	1	20 (51)
34	2	0	2 (5)	1	0	1 (3)	11	0	11 (28)
35-37	17	0	17 (44)	2	2	4 (10)	36	6	42 (108)
38	2	1	3 (8)	0	0	0 (0)	2	1	3 (7)
39	5	0	5 (13)	4	1	5 (13)	24	8	32 (82)
1951									
20-22	26	4	30 (69)	12	2	14 (32)	68	7	75 (173)
23	42	0	42 (96)	9	1	10 (23)	160	6	166 (382)
24	0	0	0 (0)	1	0	1 (2)	2	2	4 (7)
25-26	3	1	4 (9)	1	1	2 (5)	5	6	11 (25)
27-28	13	0	13 (30)	2	0	2 (5)	44	2	46 (105)
29-32	25	2	27 (62)	15	1	16 (37)	126	7	133 (306)
33	1	0	1 (2)	1	0	1 (2)	8	1	9 (21)
34	2	0	2 (5)	0	0	0 (0)	11	0	11 (25)
35-37	42	0	42 (97)	4	3	7 (16)	89	9	98 (225)
38	2	1	3 (7)	0	0	0 (0)	1	1	2 (5)
39	4	0	4 (9)	20	1	21 (48)	3	6	9 (21)
1952									
20-22	22	4	26 (59)	10	2	12 (27)	56	7	63 (143)
23	46	0	46 (104)	10	1	11 (25)	175	7	182 (413)
24	1	0	1 (2)	0	0	0 (0)	1	2	3 (7)
25-26	2	1	3 (7)	1	1	2 (5)	4	5	9 (20)
27-28	9	0	9 (20)	1	0	1 (2)	30	2	32 (73)
29-32	29	2	31 (70)	18	2	20 (45)	148	9	157 (356)
33	8	0	8 (18)	4	1	5 (11)	49	1	50 (114)
34	2	0	2 (5)	1	0	1 (2)	9	0	9 (20)
35-37	21	0	21 (48)	2	2	4 (9)	45	7	52 (118)
38	2	0	2 (4)	2	0	2 (5)	0	1	1 (2)
39	4	0	4 (9)	3	1	4 (9)	22	6	28 (64)

TABLE I.III (Continued)

	Land and Buildings				Transport Equipment Furniture & Fittings				Mechanical Equipment			
	O_{10}	U_{10}	Total		O_{10}	U_{10}	Total		O_{10}	U_{10}	Total	
1953												
20–22	27	4	31	(46)	12	2	14	(21)	69	7	76	(113)
23	24	0	24	(35)	5	1	6	(9)	92	4	96	(143)
24	0	0	0	(0)	0	0	0	(0)	2	2	4	(6)
25–26	2	1	3	(5)	1	1	2	(3)	4	5	9	(13)
27–28	10	0	10	(15)	2	1	3	(5)	35	3	38	(56)
29–32	28	2	30	(44)	17	1	18	(27)	139	8	147	(218)
33	10	0	10	(15)	5	1	6	(9)	65	1	66	(98)
34	10	0	10	(15)	2	0	2	(3)	41	0	41	(61)
35–37	22	0	22	(32)	2	2	4	(6)	48	7	55	(82)
38	3	0	3	(4)	0	0	0	(0)	2	1	3	(5)
39	6	0	6	(9)	5	1	6	(9)	33	8	41	(60)
1954												
20–22	14	4	18	(20)	6	2	8	(9)	34	7	41	(45)
23	30	0	30	(33)	7	1	8	(9)	116	6	122	(134)
24	1	0	1	(2)	0	1	1	(1)	2	2	4	(5)
25–26	3	1	4	(5)	1	1	2	(2)	5	7	12	(13)
27–28	9	0	9	(10)	1	0	1	(1)	29	2	31	(34)
29–32	36	3	39	(43)	22	1	23	(25)	182	10	192	(212)
33	12	0	12	(13)	5	1	6	(7)	73	1	74	(81)
34	17	0	17	(19)	4	0	4	(4)	75	0	75	(83)
35–37	37	0	37	(41)	4	3	7	(8)	79	9	88	(97)
38	3	1	4	(5)	3	0	3	(3)	0	1	1	(1)
39	6	1	7	(8)	5	1	6	(6)	32	8	40	(44)
1955												
20–22	52	7	59	(62)	24	3	27	(29)	132	12	144	(152)
23	36	0	36	(38)	8	1	9	(10)	136	6	142	(151)
24	1	0	1	(1)	0	1	1	(1)	3	3	6	(7)
25–26	1	1	2	(2)	0	1	1	(1)	2	5	7	(8)
27–28	12	0	12	(13)	2	1	3	(3)	40	3	43	(46)
29–32	24	2	26	(28)	15	1	16	(17)	121	9	130	(138)
33	25	0	25	(26)	11	2	13	(14)	155	2	157	(167)
34	9	0	9	(10)	2	0	2	(2)	39	0	39	(41)
35–37	23	0	23	(24)	2	3	5	(5)	49	8	52	(61)
38	2	1	3	(3)	0	0	0	(0)	2	1	3	(3)
39	6	1	7	(8)	4	1	5	(5)	27	8	35	(37)
1956												
20–22	54	8	62	(61)	25	3	28	(28)	137	13	150	(148)
23	39	0	39	(38)	9	1	10	(10)	151	9	160	(158)
24	0	1	1	(1)	0	1	1	(1)	3	3	6	(6)
25–26	2	1	3	(3)	3	1	4	(4)	1	9	10	(10)
27–28	14	0	14	(14)	2	0	2	(2)	45	3	48	(47)
29–32	39	2	41	(40)	24	3	27	(27)	196	14	210	(207)
33	35	1	36	(35)	16	2	18	(18)	221	2	223	(220)
34	15	0	15	(15)	3	0	3	(3)	65	0	65	(64)
35–37	33	0	33	(32)	4	4	8	(8)	70	12	82	(81)
38	4	1	5	(5)	0	0	0	(0)	3	2	5	(5)
39	9	1	10	(10)	7	2	9	(9)	42	14	56	(55)

TABLE L.11 (Continued)

	Land and Buildings				Transport Equipment Furniture & Fittings				Mechanical Equipment			
	O 10	U 10	Total		O 10	U 10	Total		O 10	U 10	Total	
1957												
20–22	69	53	122	(119)	23	21	44	(43)	123	95	218	(23)
23	39	3	42	(41)	6	4	10	(10)	117	54	171	(167)
24	0	1	1	(1)	0	1	1	(1)	1	4	5	(5)
25–26	6	6	12	(12)	1	5	6	(6)	9	38	47	(46)
27–28	15	0	15	(15)	3	2	5	(5)	49	10	59	(57)
29–32	36	31	67	(65)	16	19	35	(34)	152	130	282	(276)
33	23	5	28	(27)	7	10	17	(17)	92	11	103	(101)
34	4	0	4	(4)	2	0	2	(2)	16	0	16	(16)
35–37	33	5	38	(37)	4	25	29	(28)	68	82	150	(147)
38	7	3	10	(10)	1	1	2	(2)	4	5	9	(9)
39	6	5	11	(11)	5	10	15	(15)	32	81	113	(110)
1958												
20–22	129	54	183		43	21	64		229	95	324	
23	58	2	60		9	4	13		176	44	220	
24	1	7	8		1	7	8		6	32	38	
25–26	4	5	9		1	4	5		7	31	38	
27–28	13	1	14		2	3	5		40	15	55	
29–32	27	12	39		12	8	20		111	53	164	
33	22	2	24		7	5	12		91	5	96	
34	12	0	12		9	0	9		53	0	53	
35–37	44	3	47		5	17	22		90	56	146	
38	147	14	161		27	5	32		88	22	110	
39	1	1	2		1	2	3		5	13	18	
1959												
20–22	101	30	131	(117)	33	12	45	(40)	196	54	250	(224)
23	44	1	45	(40)	9	3	12	(11)	166	31	197	(176)
24	1	5	6	(5)	1	6	7	(6)	4	26	30	(27)
25–26	4	4	8	(7)	1	3	4	(4)	6	26	32	(28)
27–28	11	0	11	(10)	2	1	3	(3)	37	5	42	(37)
29–32	95	35	130	(116)	34	22	56	(50)	315	149	464	(414)
33	26	4	30	(27)	10	8	18	(16)	107	8	115	(103)
34	12	0	12	(10)	2	0	2	(2)	49	0	49	(43)
35–37	30	3	33	(30)	5	16	21	(19)	57	53	110	(98)
38	39	19	58	(52)	7	7	14	(12)	34	31	65	(58)
39	4	2	6	(5)	1	3	4	(4)	11	26	37	(33)
1960												
20–22	96	27	123	(106)	31	11	42	(36)	187	48	235	(203)
23	48	2	50	(43)	10	3	13	(11)	182	36	218	(188)
24	2	10	12	(10)	1	12	13	(11)	8	54	62	(54)
25–26	8	6	14	(13)	2	5	7	(6)	11	41	52	(45)
27–28	19	0	19	(17)	4	2	6	(5)	65	7	72	(62)
29–32	48	17	65	(56)	17	10	27	(23)	159	71	230	(199)
33	22	2	24	(21)	9	3	12	(10)	93	3	96	(83)
34	13	0	13	(11)	2	0	2	(2)	53	0	53	(46)
35–37	33	3	36	(31)	5	12	17	(15)	64	40	104	(83)
38	154	18	172	(149)	28	7	35	(30)	135	30	165	(142)
39	4	2	6	(5)	2	3	5	(4)	12	27	39	(33)

TABLE L111 (Continued)

	Land and Buildings				Transport Equipment Furniture & Fittings				Mechanical Equipment			
	O_{10}	U_{10}	Total		O_{10}	U_{10}	Total		O_{10}	U_{10}	Total	
1961												
20-22	138	93	231	(194)	47	37	84	(70)	625	165	790	(663)
23	40	1	41	(34)	16	1	17	(14)	248	18	266	(223)
24	11	4	15	(13)	5	5	10	(8)	16	20	36	(30)
25-26	14	1	15	(13)	3	1	4	(3)	14	8	22	(19)
27-28	23	1	24	(20)	5	4	9	(8)	124	20	144	(121)
29-32	39	1	40	(34)	17	0	17	(14)	122	4	126	(106)
33	32	2	34	(29)	12	4	16	(13)	81	5	86	(72)
34	30	0	30	(25)	4	0	4	(4)	181	0	181	(152)
35-37	54	2	56	(47)	10	11	21	(18)	89	34	123	(104)
38	20	19	39	(33)	27	7	34	(29)	30	30	60	(50)
39	2	0	2	(2)	1	1	2	(2)	4	5	9	(7)
1962												
20-22	359	62	421	(315)	55	24	79	(59)	326	110	436	(326)
23	80	1	81	(61)	15	1	16	(12)	239	11	250	(187)
24	2	0	2	(2)	2	1	3	(2)	18	1	19	(14)
25-26	13	1	14	(10)	3	1	4	(3)	19	6	25	(18)
27-28	12	0	12	(9)	7	1	8	(6)	78	2	80	(69)
29-32	159	7	166	(124)	22	4	26	(19)	245	29	274	(205)
33	90	4	94	(70)	15	8	23	(17)	235	9	234	(173)
34	42	0	42	(31)	2	0	2	(2)	663	0	663	(496)
35-37	61	1	62	(46)	14	4	18	(14)	113	13	126	(94)
38	73	28	101	(75)	18	11	29	(22)	35	45	80	(60)
39	3	0	3	(2)	1	1	2	(2)	7	7	14	(10)
1963												
20-22	235	67	302	(226)	59	26	85	(63)	352	118	470	(351)
23	124	2	126	(94)	18	3	21	(16)	417	37	454	(339)
24	5	2	7	(6)	4	3	7	(5)	28	11	39	(29)
25-26	22	3	25	(19)	6	2	8	(6)	33	16	49	(36)
27-28	42	2	44	(33)	8	7	15	(11)	241	37	278	(208)
29-32	91	7	98	(73)	27	4	31	(23)	253	30	283	(212)
33	67	9	76	(57)	65	19	84	(63)	260	20	280	(209)
34	28	0	28	(21)	4	0	4	(3)	216	0	216	(161)
35-37	91	3	94	(71)	21	14	35	(26)	136	47	183	(137)
38	61	16	77	(57)	11	6	17	(13)	17	27	44	(33)
39	5	1	6	(4)	1	1	2	(2)	9	9	18	(13)
1964												
20-22	165	18	183	(133)	53	7	60	(44)	329	32	361	(261)
23	154	2	156	(113)	19	4	23	(17)	565	45	610	(441)
24	15	7	22	(16)	7	8	15	(11)	37	36	73	(53)
25-26	47	10	57	(41)	6	9	15	(11)	108	66	174	(126)
27-28	25	1	26	(19)	10	3	13	(9)	104	13	117	(85)
29-32	114	3	117	(85)	23	2	25	(18)	203	14	217	(157)
33	127	12	139	(100)	31	23	54	(39)	367	24	391	(283)
34	22	0	22	(16)	4	0	4	(3)	65	0	65	(47)
35-37	111	5	116	(84)	30	24	54	(39)	259	78	337	(244)
38	73	60	133	(96)	20	24	44	(32)	152	100	252	(183)
39	6	1	7	(5)	1	2	3	(2)	13	13	26	(19)

TABLE I.111 (Continued)

	Land and Buildings				Transport Equipment Furniture & Fittings				Mechanical Equipment			
	O_{10}	U_{10}	Total		O_{10}	U_{10}	Total		O_{10}	U_{10}	Total	
1965												
20–22	352	64	416	(305)	67	25	92	(68)	366	114	480	(352)
23	124	2	126	(92)	24	3	27	(20)	488	38	526	(386)
24	4	4	8	(6)	6	5	11	(8)	33	22	55	(40)
25–26	60	5	65	(48)	7	5	12	(9)	70	37	107	(78)
27–28	87	2	89	(65)	8	7	15	(11)	193	35	228	(168)
29–32	654	8	662	(486)	37	5	42	(31)	2168	33	2201	(1615)
33	122	9	131	(96)	26	18	44	(32)	330	18	348	(256)
34	91	0	91	(67)	60	0	60	(44)	2298	0	2298	(1687)
35–37	134	5	139	(102)	29	27	56	(41)	258	87	345	(253)
38	94	48	142	(104)	11	19	30	(22)	90	78	168	(124)
39	13	1	14	(10)	2	3	5	(4)	18	23	41	(30)
1966												
20–22	322	53	375	(268)	78	21	99	(70)	407	93	500	(357)
23	123	1	124	(89)	24	3	27	(19)	473	29	502	(358)
24	6	4	10	(7)	8	4	12	(9)	38	20	58	(41)
25–26	29	4	33	(24)	11	3	14	(10)	38	23	61	(43)
27–28	134	3	137	(98)	21	11	32	(23)	267	56	323	(230)
29–32	127	9	136	(97)	33	6	39	(28)	337	40	377	(269)
33	117	11	128	(92)	33	21	54	(39)	443	21	464	(331)
34	443	0	443	(316)	33	0	33	(24)	184	0	184	(131)
35–37	216	7	223	(159)	43	33	76	(55)	304	110	414	(296)
38	93	42	135	(96)	19	16	35	(25)	55	69	124	(89)
39	8	0	8	(6)	2	2	4	(3)	7	12	19	(13)

ciation estimates and other purposes in my further analysis.

The 1961-66 period $^{O}10$ investment, grouped for convenience as already described, was subject to the allocation given by the 1963-66 Surveys.(1) The allocation of the $^{O}10$ 1950-57 period investments deriving from the 1958 Survey is given by Coutsoumaris.(2) A further allocation estimate is given in the same sources for the year 1957 alone.(3) The Coutsoumaris (1958 Survey) 1950-57 allocation was applied to our $^{O}10$ investment estimates for the years 1950-56. For the years 1957 and 1958 I applied the allocation given by Coutsoumaris (1958 Survey) for the year 1957. I then obtained a weighed average of the 1961-66 and 1950-57 allocations (having first obtained an estimate of the 1961-66 period). I next applied this "average" allocation on the 1959 and 1960 $^{O}10$ investment estimates. For the period before 1950 the allocation of investments in land - buildings, transport - furniture - fittings and mechanical equipment (machinery), follows the allocation shares of the 1950-57 for all vintages. Such a 1950-57 allocation is arrived at by adding estimates as to the allocation of $^{U}10$ investments to the Coutsoumaris (1958 Survey) 1950-57 $^{O}10$ shares and calculating a combined $^{O}10$ and $^{U}10$ estimate.

For the allocation of $^{U}10$ capital formation the available information is unfortunately little and unreliable, so that I decided to employ for the entire period the only accurate evidence from the Survey of the year 1963, as modified and corrected for our purposes from the original data.(4) Clearly this method could be improved as far as statistical accuracy is concerned, particularly for the earlier years, but this would require additional information which is not available, as all other hints as to the composition and allocation of $^{U}10$ investments prior to 1963 are unreliable or apply to extremely small samples. One may observe, nevertheless, that the

(1) N.S.S.O.: 1963 Survey, Op.cit., 1967, pp. 120-31; 1964 Survey, Op.cit., 1968, p. 92; 1965 Survey, Op.cit., 1969, p. 90; 1966 Survey, Op.cit., 1969, p. 90.
(2) O. Coutsoumaris: Op.cit., p. 176.
(3) Ibid, p. 379.
(4) N.S.S.O.: 1963 Survey, Op.cit., p. 32. Also see p. above.

ciation estimates and other purposes in my further analysis.

The 1961-66 period $^{O}10$ investment, grouped for convenience as already described, was subject to the allocation given by the 1963-66 Surveys.(1) The allocation of the $^{O}10$ 1950-57 period investments deriving from the 1958 Survey is given by Coutsoumaris.(2) A further allocation estimate is given in the same sources for the year 1957 alone.(3) The Coutsoumaris (1958 Survey) 1950-57 allocation was applied to our $^{O}10$ investment estimates for the years 1950-56. For the years 1957 and 1958 I applied the allocation given by Coutsoumaris (1958 Survey) for the year 1957. I then obtained a weighed average of the 1961-66 and 1950-57 allocations (having first obtained an estimate of the 1961-66 period). I next applied this "average" allocation on the 1959 and 1960 $^{O}10$ investment estimates. For the period before 1950 the allocation of investments in land - buildings, transport - furniture - fittings and mechanical equipment (machinery), follows the allocation shares of the 1950-57 for all vintages. Such a 1950-57 allocation is arrived at by adding estimates as to the allocation of $^{U}10$ investments to the Coutsoumaris (1958 Survey) 1950-57 $^{O}10$ shares and calculating a combined $^{O}10$ and $^{U}10$ estimate.

For the allocation of $^{U}10$ capital formation the available information is unfortunately little and unreliable, so that I decided to employ for the entire period the only accurate evidence from the Survey of the year 1963, as modified and corrected for our purposes from the original data.(4) Clearly this method could be improved as far as statistical accuracy is concerned, particularly for the earlier years, but this would require additional information which is not available, as all other hints as to the composition and allocation of $^{U}10$ investments prior to 1963 are unreliable or apply to extremely small samples. One may observe, nevertheless, that the

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(1) N.S.S.G.: 1963 Survey, Op.cit., 1967, pp. 120-31; 1964 Survey, Op.cit., 1968, p. 92; 1965 Survey, Op.cit., 1969, p. 90; 1966 Survey, Op.cit., 1969, p. 90.
(2) G. Coutsoumaris: Op.cit., p. 176.
(3) Ibid, p. 379.
(4) N.S.S.G.: 1963 Survey, Op.cit., p. 32. Also see p. above.

TABLE LIV

Allocation of Gross Fixed Capital Investment, $O_{10} + U_{10}$: 1945 - 1949

In Million Drachmas - Constant 1958 Prices

	Land	Equipment	Machinery	Total Invest.		Land	Equipment	Machinery	Total Invest.
1945					1946				
20-22	2	1	4	7		4	2	10	16
23	4	1	14	19		10	2	33	45
24	0	0	1	1		0	0	1	1
25-26	1	0	1	2		1	1	3	5
27-28	2	0	5	7		3	1	12	16
29-32	2	1	8	11		4	2	20	26
33	0	0	3	3		1	0	5	6
34	0	0	0	0		0	0	1	1
35-37	2	1	6	9		6	1	14	21
38	0	0	0	0		0	0	0	0
39	0	0	1	1		0	1	3	4
1947					1948				
20-22	9	4	23	36		30	14	76	120
23	22	4	74	100		76	16	258	350
24	0	0	3	3		0	0	3	3
25-26	3	1	7	11		4	2	11	17
27-28	7	2	26	35		27	5	95	127
29-32	9	6	45	59		34	21	171	226
33	2	1	11	14		6	5	41	52
34	0	0	2	2		1	0	6	7
35-37	13	3	32	48		53	10	129	192
38	1	0	0	1		2	0	1	3
39	1	2	6	9		2	5	14	21
1949									
20-22	39	19	98	156					
23	81	17	275	373					
24	0	0	3	3					
25-26	2	1	7	10					
27-28	26	5	92	123					
29-32	24	15	120	159					
33	5	3	34	42					
34	2	1	10	13					
35-37	29	5	70	104					
38	2	0	1	3					
39	7	12	38	57					

composition of investment expenditures of handicraft industries and other small-scale establishments and the allocation in categories of expenditures (buildings, machinery, etc.), is expected to vary over time at a much slower rate than that in larger (and increasingly mechanised) units, so that the deviations from the correct allocation are not in this case expected to be disturbingly high.

BIBLIOGRAPHICAL APPENDIX TO CHAPTER NINE , PARA. B'.

The following issues have been directly or indirectly helpful for the assessment of numerous economic variables and for much useful background information:

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TABLE LV

20 - 22. Food - Beverages - Tobacco. Total Investment $O_{10} + U_{10}$ at Constant 1958 Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
7.0	6.6	6.3	5.9	5.5	5.2	4.8	4.4	4.1	3.7	3.4	3.0	2.6	2.3	1.9	1.5	1.2	0.8	0.4	0.1	-	-
7.0	16.0	15.2	14.3	13.5	12.7	11.8	11.0	10.2	9.3	8.5	7.7	6.8	7.0	5.2	4.3	3.5	2.7	1.8	1.0	0.2	-
	22.6	36.0	34.1	32.2	30.4	28.5	26.6	24.8	22.9	21.0	19.1	17.3	15.4	13.5	11.7	9.8	7.9	6.0	4.2	2.3	0.4
		57.5	120.0	113.8	107.5	101.3	95.0	88.8	82.6	76.3	70.1	63.8	57.6	51.4	45.1	38.8	32.6	26.4	20.2	13.9	7.7
			174.3	156.0	147.9	139.8	131.7	193.8	115.4	107.3	99.2	91.1	83.0	74.9	66.8	58.0	50.5	42.4	34.3	26.2	18.1
				321.0	334.0	316.6	299.3	281.9	264.5	247.2	229.8	212.4	194.0	177.7	160.3	142.9	125.6	108.2	90.8	73.5	56.1
					637.7	274.0	259.8	245.5	231.2	216.9	202.8	188.5	174.3	160.0	145.8	131.5	117.3	103.0	88.8	74.5	60.3
						876.8	229.0	217.0	205.2	193.3	181.4	169.5	157.5	145.6	133.7	121.8	109.9	98.0	86.1	74.2	62.3
							1056.8	180.0	170.6	162.3	151.9	142.6	133.2	123.8	114.5	105.1	95.8	96.4	77.0	67.7	58.2
								1175.9	74.0	70.1	66.3	62.4	58.6	54.8	50.9	47.1	43.2	39.4	35.5	31.7	27.8
									1179.4	244.0	231.3	218.6	205.9	193.2	180.6	167.9	155.2	142.5	129.8	117.1	104.4
										1349.4	257.0	224.7	212.3	200.0	187.7	175.4	163.0	150.7	138.4	126.1	113.8
											1499.6	375.0	357.0	339.0	321.0	303.0	285.0	267.0	249.0	231.0	213.0
												1775.3	571.0	543.0	515.0	487.1	459.1	431.1	403.1	375.1	347.2
													2229.1	381.0	362.3	343.7	325.0	306.3	287.6	269.0	250.3
														2465.0	345.0	328.1	311.2	294.3	277.4	260.5	243.6
															2646.2	927.0	875.1	823.2	771.3	719.3	667.4
																3392.5	700.0	671.3	642.6	613.9	585.2
																	3859.9	640.0	609.9	579.8	549.8
																		4238.4	438.0	416.1	394.2
																			4385.1	725.0	693.8
																				4797.1	695.0
																					5148.7

Annual Depreciation Rates:

Inv. 1945-1956 = 5.2%

Inv. 1957 = 4.8%

Inv. 1958-1960 = 4.9%

Inv. 1961 = 5.6%

Inv. 1962 = 4.1%

Inv. 1963 = 4.7%

Inv. 1964 = 5.0%

Inv. 1965 = 4.3%

(Inv. 1966 = 4.5%)

TABLE LV

20 - 22. Food - Beverages - Tobacco. Total Investment $O_{10} + U_{10}$ at Constant 1958 Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
7.0	6.6	6.3	5.9	5.5	5.2	4.8	4.4	4.1	3.7	3.4	3.0	2.6	2.3	1.9	1.5	1.2	0.8	0.4	0.1	-	-
7.0	16.0	15.2	14.3	13.5	12.7	11.8	11.0	10.2	9.3	8.5	7.7	6.8	7.0	5.2	4.3	3.5	2.7	1.8	1.0	0.2	-
	22.6	36.0	34.1	32.2	30.4	28.5	26.6	24.8	22.9	21.0	19.1	17.3	15.4	13.5	11.7	9.8	7.9	6.0	4.2	2.3	0.4
		57.5	120.0	113.8	107.5	101.3	95.0	88.8	82.6	76.3	70.1	63.8	57.6	51.4	45.1	38.8	32.6	26.4	20.2	13.9	7.7
			174.3	156.0	147.9	139.8	131.7	193.8	115.4	107.3	99.2	91.1	83.0	74.9	66.8	58.0	50.5	42.4	34.3	26.2	18.1
				321.0	334.0	316.6	299.3	281.9	264.5	247.2	229.8	212.4	194.0	177.7	160.3	142.9	125.6	108.2	90.8	73.5	56.1
					637.7	274.0	259.8	245.5	231.2	217.0	202.8	188.5	174.3	160.0	145.8	131.5	117.3	103.0	88.8	74.5	60.3
						876.8	229.0	217.0	205.2	193.3	181.4	169.5	157.5	145.6	133.7	121.8	109.9	98.0	86.1	74.2	62.3
							1056.8	180.0	170.6	161.3	151.9	142.6	133.2	123.8	114.5	105.1	95.8	96.4	77.0	67.7	58.2
								1175.9	74.0	70.1	66.3	62.4	58.6	54.8	50.9	47.1	43.2	39.4	35.5	31.7	27.8
									1179.4	244.0	231.3	218.6	205.9	193.2	180.6	167.9	155.2	142.5	129.8	117.1	104.4
										1349.4	257.0	224.7	212.3	200.0	187.7	175.4	163.0	150.7	138.4	126.1	113.8
											1499.6	375.0	357.0	339.0	321.0	303.0	285.0	267.0	249.0	231.0	213.0
												1775.3	571.0	543.0	515.0	487.1	459.1	431.1	403.1	375.1	347.2
													2229.1	381.0	362.3	343.7	325.0	306.3	287.6	269.0	250.3
														2465.0	345.0	328.1	311.2	294.3	277.4	260.5	243.6
															2646.2	927.0	875.1	823.2	771.3	719.3	667.4
																3392.5	700.0	671.3	642.6	613.9	585.2
																	3859.9	640.0	609.9	579.8	549.8
																		4238.4	438.0	416.1	394.2
																			4385.1	725.0	693.8
																				4797.1	695.0
																					5148.7

Annual Depreciation Rates:

Inv. 1945-1956 = 5.2%

Inv. 1957 = 4.8%

Inv. 1958-1960 = 4.9%

Inv. 1961 = 5.6%

Inv. 1962 = 4.1%

Inv. 1963 = 4.7%

Inv. 1964 = 5.0%

Inv. 1965 = 4.3%

(Inv. 1966 = 4.5%)

TABLE LV (Continued)

23. Textiles. Total Investment $O_{10} + U_{10}$ at Constant 1958 Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
19.0	17.9	16.8	15.7	14.7	13.6	12.5	11.4	10.3	9.2	8.2	7.1	6.0	4.9	3.8	2.7	1.7	0.1	-	-	-	-
19.0	45.0	42.4	39.9	37.3	39.7	32.2	29.6	27.0	24.5	21.9	19.3	16.8	14.2	11.6	9.1	6.5	4.0	1.4	-	-	-
	62.9	100.0	94.3	88.6	82.9	77.2	71.5	65.8	60.1	54.4	48.7	43.0	37.3	31.6	25.9	20.2	14.5	8.8	3.1	-	-
		159.2	350.0	330.0	310.1	290.1	270.2	250.2	230.3	210.3	190.4	170.4	150.5	130.5	110.6	90.6	70.7	50.7	30.8	10.8	-
			499.9	473.0	451.7	430.5	409.2	387.9	366.7	345.4	324.2	302.9	281.6	260.4	239.1	217.9	196.6	175.3	154.1	132.8	111.6
				843.6	919.0	866.6	814.2	761.8	657.1	604.7	552.3	499.9	447.5	395.2	342.8	290.4	238.0	185.6	133.2	80.9	24.5
					1712.0	501.0	472.4	443.9	415.3	386.8	358.2	329.6	301.1	272.5	244.0	215.4	186.9	158.3	129.7	101.2	72.6
						2110.1	542.0	511.1	480.2	449.3	418.4	387.5	356.6	325.7	294.8	263.9	233.1	202.2	171.3	140.4	109.5
							2520.5	187.0	176.3	165.7	155.0	144.4	133.7	123.0	112.9	101.7	91.1	80.4	69.7	59.1	48.4
								2545.0	176.0	166.0	155.9	145.9	135.9	125.8	115.8	105.8	95.7	85.7	75.7	65.6	55.6
									2495.7	199.0	187.6	176.3	165.0	153.6	142.3	130.9	119.6	108.2	96.9	85.6	74.2
										2511.7	206.0	194.2	182.5	170.8	159.0	147.3	135.5	123.8	112.1	100.3	88.5
											2523.1	218.0	205.3	192.7	180.1	167.4	154.8	142.1	129.5	116.8	104.2
												2534.9	293.0	276.0	259.0	242.0	225.0	208.0	181.0	174.0	157.0
													2609.1	227.0	213.8	200.7	187.5	174.3	161.2	148.0	134.8
														2600.2	249.0	298.0	213.9	199.9	185.8	171.8	157.8
															2593.4	271.0	254.5	237.9	221.4	204.9	188.3
																2601.4	260.0	245.7	231.4	217.1	202.8
																	2581.5	249.0	423.4	397.8	372.2
																		2537.3	571.0	538.4	505.9
																			2991.3	498.0	469.6
																				3143.5	466.0
																					3243.5

Annual Depreciation Rates:

Inv. 1945-1956 = 5.7%
Inv. 1957 = 5.8%
Inv. 1958-1960 = 5.8%
Inv. 1961 = 6.1%
Inv. 1962 = 5.5%
Inv. 1963 = 5.7%
Inv. 1964 = 5.7%
Inv. 1965 = 5.7%
(Inv. 1966 = 5.8%)

TABLE LV (Continued)

24. Clothing - Footwear. Total Investment $O_{10} + U_{10}$ at Constant 1958 Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.3	0.2	0.2	0.1	0.1	-	-	-	-	-
1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.6	0.6	0.5	0.4	0.4	0.3	0.2	0.2	0.1	0.1	-	-	-	-
	1.9	3.0	2.8	2.6	2.5	2.3	2.1	1.9	1.8	1.6	1.4	1.3	1.1	0.9	0.7	0.6	0.4	0.2	-	-	-
		4.8	3.0	2.8	2.6	2.5	2.3	2.1	1.9	1.8	1.6	1.4	1.3	1.1	0.9	0.7	0.6	0.4	0.2	-	-
			7.5	3.0	2.8	2.6	2.5	2.3	2.1	1.9	1.8	1.6	1.4	1.3	1.1	0.9	0.7	0.6	0.4	0.2	-
				10.0	10.0	9.4	8.8	8.3	7.7	7.1	6.5	5.9	5.4	4.8	4.2	3.6	3.0	2.5	1.9	1.3	0.7
					19.4	9.0	8.5	7.9	7.9	6.9	6.4	5.9	5.3	4.8	4.3	3.8	3.2	2.7	2.2	1.7	1.2
						27.1	9.0	8.5	7.9	7.4	6.9	6.4	5.9	5.3	4.8	4.3	3.8	3.2	2.7	2.2	1.7
							34.4	6.0	5.3	4.9	4.6	4.3	3.9	3.6	3.2	2.9	2.5	2.2	1.8	1.5	1.1
								38.1	7.0	6.6	6.2	5.8	5.4	5.0	4.6	4.1	3.7	3.3	2.9	2.5	2.1
									42.1	9.0	8.5	7.9	7.4	6.9	6.4	5.9	5.3	4.8	4.3	3.8	3.2
										48.1	8.0	7.5	7.1	6.6	6.1	5.7	5.2	4.7	4.3	3.8	3.4
											52.7	7.0	6.6	6.3	5.9	5.6	5.2	4.9	4.5	4.2	3.8
												55.7	54.0	50.9	47.7	44.6	41.5	38.3	35.2	32.1	28.9
													105.3	39.0	36.7	34.5	32.2	29.9	27.7	25.4	23.2
														136.9	75.0	70.6	66.3	61.9	57.6	53.2	48.9
															201.9	51.0	48.3	45.7	43.0	40.4	37.9
																239.0	18.0	16.9	15.7	14.6	13.5
																	240.0	40.0	37.6	35.2	32.8
																		262.2	80.0	75.6	71.2
																			322.0	54.0	50.8
																				351.7	57.0
																					381.2

Annual Depreciation Rates:

Inv. 1945-1956 = 5.8%
Inv. 1957 = 5.0%
Inv. 1958-1960 = 5.8%
Inv. 1961 = 5.2%
Inv. 1962 = 6.3%
Inv. 1963 = 6.0%
Inv. 1964 = 5.5%
Inv. 1965 = 6.0%
(Inv. 1966 = 6.0%)

TABLE L/ (Continued)

25 - 26. Wood - Cork - Furniture. Total Investment $O_{10} + U_{10}$ at Constant 1958 Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
2.0	1.9	1.8	1.7	1.5	1.3	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	-	-	-	-	-
2.0	5.0	4.7	4.5	4.2	3.9	3.6	3.4	3.1	2.8	2.6	2.3	2.0	1.8	1.5	1.2	0.9	0.7	0.4	0.1	-	-
	6.9	11.0	10.4	9.8	9.2	8.6	8.0	7.4	6.8	6.2	5.6	5.1	4.5	3.9	3.2	2.7	2.1	1.5	0.9	0.3	-
		17.5	17.0	16.1	15.2	14.2	13.3	12.4	11.5	10.6	9.6	8.7	7.8	6.9	6.0	5.1	4.1	3.2	2.3	1.4	0.5
			33.6	10.0	9.5	8.9	8.4	7.8	7.3	6.8	6.2	5.7	5.1	4.6	4.1	3.5	3.0	2.4	1.9	1.4	0.8
				41.6	41.0	38.8	36.6	34.3	32.1	29.9	27.7	25.5	23.3	21.1	18.9	16.6	14.4	12.2	10.0	7.8	5.6
					80.1	39.0	36.3	34.8	32.7	30.6	28.5	26.4	24.2	22.1	20.0	17.9	15.8	13.7	11.6	9.5	7.4
						114.3	32.0	30.3	28.5	26.8	25.1	23.4	21.6	19.9	18.2	16.4	14.7	13.0	11.3	9.5	7.8
							138.7	21.0	19.9	18.7	17.6	16.5	15.3	14.2	13.1	11.9	10.8	9.7	8.5	7.4	6.2
								152.1	20.0	18.9	17.8	16.8	15.7	14.6	13.5	12.4	11.4	10.3	9.2	8.1	7.0
									162.5	11.0	10.4	9.8	9.2	8.6	8.0	7.4	6.8	6.2	5.6	5.1	4.5
										162.9	17.0	16.1	15.2	14.2	13.3	12.4	11.5	10.6	9.6	8.7	7.8
											168.5	64.0	61.0	58.1	55.2	52.2	49.3	46.3	43.4	40.4	37.5
												220.6	52.0	49.3	46.6	43.9	41.2	38.5	35.8	33.1	30.4
													257.2	39.0	37.0	34.9	32.9	30.9	28.9	26.8	24.8
														278.4	64.0	60.7	57.3	54.0	50.7	47.4	44.0
															314.7	35.0	33.4	31.8	30.3	28.7	97.1
																334.1	31.0	29.5	28.0	26.4	24.9
																	340.4	61.0	57.9	54.9	51.8
																		375.2	178.0	168.2	158.4
																			524.0	135.0	128.6
																				620.1	77.0
																					652.1

Annual Depreciation Rates:

Inv. 1945-1956 = 5.4%
Inv. 1957 = 4.6%
Inv. 1958-1960 = 5.2%
Inv. 1961 = 4.5%
Inv. 1962 = 4.9%
Inv. 1963 = 5.0%
Inv. 1964 = 5.5%
Inv. 1965 = 4.7%
(Inv. 1966 = 4.9%)

TABLE LV (Continued)

27 - 28. Paper - Printing. Total Investment $O_{10} + U_{10}$ at Constant 1958 Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
7.0	6.6	6.2	5.8	5.4	5.0	4.6	4.2	3.9	3.5	3.1	2.7	2.3	1.9	1.5	1.1	0.7	0.3	-	-	-	-
7.0	16.0	15.1	14.2	13.3	12.4	11.5	10.6	9.7	8.8	7.9	7.0	6.1	5.2	4.3	3.4	2.6	1.7	0.8	-	-	-
	22.6	35.0	33.0	31.1	29.1	27.2	25.2	23.2	21.3	19.3	17.4	15.4	13.4	11.5	9.5	7.6	5.6	3.6	1.7	-	-
		56.3	127.0	119.9	112.0	105.7	98.5	91.4	84.3	77.2	70.1	63.0	55.9	48.8	41.6	34.5	27.4	20.3	13.2	6.1	-
			180.0	123.0	116.1	109.2	102.3	95.4	88.6	81.7	74.8	67.9	61.0	54.1	47.2	40.3	33.4	26.6	19.7	12.8	5.9
				292.7	131.0	123.7	116.3	109.0	101.6	94.3	87.0	79.6	72.3	65.0	57.6	50.3	43.0	35.6	28.3	21.0	13.6
					406.4	140.0	132.2	124.3	116.5	108.6	100.8	93.0	85.1	77.3	69.4	61.6	53.8	45.9	38.1	30.2	22.4
						521.9	95.0	89.7	84.4	79.0	73.7	68.4	63.1	57.8	52.4	47.1	41.8	36.5	31.2	25.8	20.5
							584.3	76.0	71.7	67.5	63.2	59.0	54.7	50.5	46.2	41.9	37.7	33.4	29.2	24.9	20.7
								622.6	45.0	42.5	40.0	37.4	34.9	32.4	29.9	27.4	24.8	22.3	19.8	17.3	14.8
									625.7	62.0	58.5	56.0	51.6	48.1	44.6	41.2	37.7	34.2	30.7	27.2	23.8
										643.1	63.0	59.5	55.9	52.4	48.9	45.4	41.8	38.3	34.8	31.2	27.7
											658.2	77.0	72.6	68.2	63.8	59.4	55.0	50.7	42.3	41.9	37.5
												683.6	74.0	69.8	65.6	61.3	57.1	52.9	48.7	44.5	40.2
													701.6	50.0	47.1	44.3	41.4	38.6	35.7	32.9	30.0
														691.7	84.0	79.2	74.4	69.6	64.8	60.1	55.3
															712.3	149.0	139.9	130.8	121.7	112.6	103.5
																793.8	75.0	70.4	65.8	61.3	56.7
																	791.8	252.0	236.6	221.2	205.9
																		962.5	113.0	106.4	99.9
																			975.3	244.0	231.1
																				1121.4	351.0
																					1360.5

Annual Depreciation Rates:

Inv. 1945-1956 = 5.6%
Inv. 1957 = 5.7%
Inv. 1958-1960 = 5.7%
Inv. 1961 = 6.1%
Inv. 1962 = 6.1%
Inv. 1963 = 6.1%
Inv. 1964 = 5.8%
Inv. 1965 = 5.3%
(Inv. 1966 = 5.2%)

TABLE LV (Continued)

29 - 32. Leather - Rubber - Chemical - Petrol. Total Investment $O_{10} + U_{10}$ at Constant 1958 Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
11.0	10.3	9.7	9.0	8.4	7.7	7.1	6.4	5.8	5.1	4.5	3.9	3.2	2.6	1.9	1.3	0.6	-	-	-	-	-
11.0	26.0	24.5	22.9	21.4	19.9	18.3	16.8	15.3	13.7	12.2	10.7	9.1	7.6	6.0	4.5	3.0	1.4	-	-	-	-
	36.3	59.0	55.5	52.0	48.5	45.1	41.6	38.1	34.6	31.1	27.7	24.2	20.7	17.2	13.7	10.3	6.8	3.3	-	-	-
		93.2	226.0	212.7	199.3	186.0	172.7	159.3	146.0	132.7	119.3	106.0	92.7	79.3	66.0	52.6	39.3	26.0	12.6	-	-
			313.4	159.0	149.6	140.2	130.8	121.5	112.1	102.7	93.3	83.9	74.6	65.2	55.8	46.4	37.0	27.7	18.3	8.9	-
				453.5	313.0	294.5	276.1	257.6	239.1	220.7	202.2	183.7	165.3	146.8	128.3	109.9	91.4	72.9	54.5	36.0	17.5
					738.0	405.0	381.1	357.2	333.3	309.4	285.5	261.6	237.7	213.8	189.9	166.0	142.1	118.3	94.4	70.5	46.6
						1096.2	472.0	444.1	416.3	388.4	360.6	332.8	304.9	277.1	249.2	221.3	193.5	165.7	137.8	110.0	82.1
							1497.5	289.0	271.9	254.9	237.8	220.8	203.7	186.7	169.6	152.6	135.5	118.5	101.4	84.4	67.3
								1687.9	280.0	263.5	247.0	230.4	213.9	197.4	180.9	164.4	147.8	131.3	114.8	98.3	81.8
									1852.1	183.0	172.2	161.4	150.6	139.8	129.0	118.2	107.4	96.6	85.8	75.0	64.2
										1903.1	274.0	257.8	241.7	225.5	209.3	193.2	177.0	160.8	144.7	128.5	112.3
											2034.2	375.0	353.2	331.5	309.7	288.0	266.2	244.5	222.7	201.0	179.2
												2249.9	223.0	210.5	198.0	185.5	173.0	160.6	148.1	135.6	123.1
													2292.2	580.0	547.5	515.0	482.6	450.1	417.6	385.1	352.6
														2678.7	278.0	262.4	246.9	231.3	215.7	200.2	184.6
															2730.7	154.0	145.5	137.1	128.6	120.1	111.6
																2643.4	348.0	331.6	315.3	298.9	282.6
																	2741.4	308.0	291.4	274.7	258.1
																		2784.3	260.0	247.3	234.5
																			2763.7	2132.0	2012.6
																				4606.5	394.0
																					4604.7

Annual Depreciation Rates:

Inv. 1945-1956 = 5.9%
Inv. 1957 = 5.8%
Inv. 1958-1960 = 5.6%
Inv. 1961 = 5.5%
Inv. 1962 = 4.7%
Inv. 1963 = 5.4%
Inv. 1964 = 4.9%
Inv. 1965 = 5.6%
(Inv. 1966 = 5.4%)

TABLE LV (Continued)

33 Non-Metallic Minerals. Total Investment $O_{10} + U_{10}$ at Constant 1958 Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
3.0	2.8	2.6	2.4	2.3	2.1	1.9	1.7	1.5	1.3	1.2	1.0	0.8	0.6	0.4	0.2	0.1	-	-	-	-	-
3.0	6.0	5.6	5.3	4.9	4.5	4.2	3.8	3.4	3.1	2.7	2.3	2.0	1.6	1.2	0.9	0.5	0.1	-	-	-	-
	8.8	14.0	13.1	12.3	11.4	10.6	9.7	8.9	8.0	7.2	6.3	5.5	4.6	3.7	2.9	2.0	1.2	0.3	-	-	-
		22.2	52.0	48.8	45.6	42.5	39.3	36.1	33.0	29.8	26.6	23.4	20.3	17.1	13.9	10.8	7.6	4.4	1.2	-	-
			72.8	42.0	39.4	36.9	34.3	31.7	29.2	26.6	24.1	21.5	18.9	16.4	13.8	11.2	8.7	6.1	3.6	1.0	-
				110.3	64.0	60.1	56.2	52.3	48.4	44.5	40.6	36.7	32.8	28.9	25.0	21.0	17.1	13.2	9.3	5.4	1.5
					167.0	25.0	23.5	21.9	20.4	18.9	17.4	15.8	14.3	12.8	11.3	9.7	8.2	6.7	5.2	3.6	2.1
						181.2	143.0	134.3	125.5	116.8	108.1	99.4	90.7	81.9	73.2	64.5	55.8	47.0	38.3	29.6	20.9
							311.5	122.0	114.5	107.1	99.7	92.2	84.8	77.3	69.9	62.5	55.0	47.6	40.1	32.7	25.2
								412.1	101.0	94.8	88.7	82.5	76.3	70.2	64.0	57.9	51.7	45.5	39.4	33.2	27.1
									484.4	207.0	194.3	181.7	169.1	156.5	143.9	131.2	118.6	106.0	93.3	80.7	68.1
										656.6	273.0	256.3	239.7	223.0	206.4	189.7	173.1	156.4	139.8	123.1	106.5
											882.1	145.0	136.9	128.8	120.6	112.5	104.4	96.3	88.2	80.0	71.9
												962.8	132.0	124.5	116.9	109.4	101.9	94.4	86.8	79.3	71.8
													1013.6	146.0	137.7	129.3	121.0	112.7	104.4	96.1	87.7
														1088.7	114.0	107.5	101.0	94.5	88.0	81.5	75.0
															1114.6	114.0	107.9	101.9	95.9	89.8	83.8
																1133.8	270.0	255.7	241.4	227.1	212.8
																	1303.3	329.0	310.6	292.1	273.7
																		1517.7	422.0	399.2	376.4
																			1807.5	384.0	363.6
																				2038.4	462.0
																					2330.1

Annual Depreciation Rates:

Inv. 1945-1946 = 6.1%
Inv. 1957 = 5.6%
Inv. 1958-1960 = 5.7%
Inv. 1961 = 5.3%
Inv. 1962 = 5.3%
Inv. 1963 = 5.6%
Inv. 1964 = 5.4%
Inv. 1965 = 5.3%
(Inv. 1966 = 5.6%)

TABLE I.V (Continued)

34. Basic Metals — Total Investment $O_{10} + U_{10}$ at Constant 1958 Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
-	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.3	0.2	0.2	0.1	0.1	-	-	-	-
	1.0	2.0	1.9	1.8	1.6	1.5	1.4	1.3	1.2	1.1	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.1	-	-	-
		2.9	7.0	6.6	6.2	5.8	5.4	5.0	4.6	4.1	3.7	3.3	2.9	2.5	2.1	1.7	1.3	0.9	0.5	0.1	-
			9.8	13.0	12.2	11.5	10.7	10.0	9.2	8.5	7.7	7.0	6.2	5.5	4.7	3.9	3.2	2.4	1.7	0.9	0.2
				22.2	36.0	33.9	31.8	29.7	27.6	25.6	23.5	21.4	19.3	17.2	15.1	13.0	10.9	8.8	6.7	4.7	2.6
					56.8	30.0	28.3	26.5	24.8	23.0	21.3	19.6	17.8	16.1	14.3	12.6	10.9	9.1	7.4	5.6	3.9
						83.4	27.0	25.4	23.9	22.3	20.7	19.2	17.6	16.0	14.5	12.9	11.3	9.8	8.2	6.6	5.1
							105.2	79.0	74.4	69.8	65.2	60.7	56.1	51.5	46.9	42.3	37.8	33.2	28.6	24.0	19.4
								177.5	106.0	99.8	93.7	87.5	81.4	75.3	69.1	63.0	56.8	50.7	44.5	38.4	32.2
									272.2	53.0	49.9	46.8	43.8	40.7	37.6	34.5	31.5	28.4	25.3	22.3	19.2
										307.7	82.0	77.2	72.5	67.7	63.0	58.2	53.5	48.7	43.9	39.2	34.4
											399.0	22.0	20.7	19.4	18.2	16.9	15.6	14.3	13.1	11.8	10.5
												365.9	74.0	69.7	65.4	61.1	56.8	52.5	48.2	43.9	39.7
													413.3	55.0	51.8	48.6	45.4	42.2	39.0	35.9	32.7
														437.4	59.0	55.6	52.1	48.7	45.3	41.9	38.5
															462.4	181.0	169.6	158.2	146.8	135.4	124.0
																605.8	529.0	494.1	459.2	424.2	389.3
																	1086.1	185.0	173.5	162.1	150.6
																		1187.1	66.0	62.4	58.9
																			1157.9	1798.0	1677.5
																				2858.0	464.0
																					3102.7

Annual Depreciation Rates:

Inv. 1946-1956 = 5.8%
Inv. 1957 = 5.8%
Inv. 1958-1960 = 5.8%
Inv. 1961 = 6.3%
Inv. 1962 = 6.6%
Inv. 1963 = 6.2%
Inv. 1964 = 5.4%
Inv. 1965 = 6.7%
(Inv. 1966 = 2.9%)

TABLE LV (Continued)

35 - 37. Metal Products - Machinery - Electrical Machinery. Total Investment $O_{10} + U_{10}$ at Constant 1958 Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
9.0	8.5	8.1	7.6	7.1	6.7	6.2	5.7	5.2	4.8	4.3	3.8	3.4	2.9	2.4	2.2	1.5	1.0	0.6	0.1	-	-
9.0	21.0	19.9	18.8	17.7	16.6	15.5	14.4	13.3	12.3	11.2	10.1	9.0	7.9	6.8	5.7	4.6	3.5	2.4	1.3	0.2	-
	29.5	48.0	45.5	43.0	40.5	38.0	35.5	33.0	30.5	28.0	25.5	23.0	20.5	18.0	15.5	13.0	10.6	8.1	5.6	3.1	0.6
		76.0	192.0	182.0	172.0	162.0	152.1	142.1	132.1	122.1	112.1	102.1	92.2	82.2	72.2	62.2	52.2	42.2	32.2	22.3	12.3
			263.9	104.0	98.6	93.2	87.8	82.4	77.0	71.5	66.1	60.7	55.3	49.9	44.5	39.1	33.7	28.3	22.9	17.5	12.1
				353.8	162.0	153.6	145.1	136.7	128.3	119.9	111.4	103.0	94.6	86.2	77.8	69.3	60.9	52.5	44.1	35.6	27.2
					496.4	338.0	320.4	302.8	285.3	267.7	250.1	232.5	215.0	197.4	179.8	162.2	144.7	127.1	109.5	91.9	74.4
						806.5	175.0	165.9	156.8	147.7	138.6	129.5	120.4	111.3	102.2	93.1	84.0	74.9	65.8	56.7	47.6
							936.0	120.0	113.8	107.5	101.3	95.0	88.8	82.6	76.3	70.1	63.8	57.6	51.4	45.1	38.9
								1001.4	146.0	138.4	130.8	123.2	115.6	108.0	100.4	92.8	85.3	77.7	70.1	62.5	54.9
									1086.9	90.0	85.3	80.6	76.0	71.3	66.6	61.9	57.2	52.6	47.9	43.2	38.5
										1108.3	121.0	114.7	108.4	102.1	95.8	89.5	83.2	76.9	70.7	64.4	58.1
											1156.1	212.0	199.9	187.8	175.7	163.7	151.6	139.5	127.4	115.3	103.2
												1288.7	215.0	203.8	192.6	181.5	170.3	159.1	147.9	136.7	125.6
													1412.5	147.0	139.3	131.7	124.1	116.4	108.8	101.1	93.5
														1456.8	135.0	128.0	121.0	113.9	106.9	99.9	92.9
															1481.4	169.0	160.4	151.8	143.1	134.5	125.9
																1533.2	154.0	146.3	138.6	130.9	123.2
																	1561.5	234.0	222.3	210.6	198.9
																		1661.9	367.0	347.2	327.4
																			1883.6	396.0	375.4
																				2114.7	510.0
																					2440.6

Annual Depreciation Rates:

Inv. 1945-1956 = 5.2%

Inv. 1957 = 5.7%

Inv. 1958-1960 = 5.2%

Inv. 1961 = 5.1%

Inv. 1962 = 5.0%

Inv. 1963 = 5.0%

Inv. 1964 = 5.4%

Inv. 1965 = 5.2%

(Inv. 1966 = 4.9%)

TABLE LV (Continued)

38. Transport Equipment. Total Investment $O_{10} + U_{10}$ at Constant 1958 Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
-	-	1.0	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.2	0.2
		1.0	3.0	2.0	2.7	2.6	2.5	2.4	2.2	2.1	2.0	1.9	1.7	1.6	1.5	1.4	1.2	1.1	1.0	0.8	0.7
			3.9	3.0	2.9	2.7	2.6	2.5	2.4	2.2	2.1	2.0	1.9	1.7	1.6	1.5	1.4	1.2	1.1	1.0	0.8
				6.8	15.0	14.4	13.7	13.1	12.5	11.8	11.2	10.6	10.0	9.3	8.7	8.1	7.4	6.8	6.2	5.5	4.9
					21.5	12.0	11.5	11.0	10.5	10.0	9.5	9.0	8.5	8.0	7.5	7.0	6.4	5.9	5.4	4.9	4.4
						32.5	11.0	10.5	10.1	9.6	9.1	8.7	8.2	7.8	7.3	6.8	6.4	5.9	5.4	5.0	4.5
							42.1	9.0	8.6	8.2	7.9	7.5	7.1	6.7	6.3	6.0	5.6	5.2	4.8	4.5	4.1
								49.2	9.0	8.6	8.2	7.9	7.5	7.1	6.7	6.3	6.0	5.6	5.2	4.8	4.5
									56.0	6.0	5.7	5.5	5.2	5.0	4.7	4.5	4.2	4.0	3.7	3.5	3.2
										59.2	10.0	9.6	9.2	8.7	8.3	7.9	7.5	7.1	6.6	6.2	5.8
											66.3	21.0	20.2	19.3	18.5	17.6	16.8	16.0	15.1	14.3	13.4
												84.3	303.0	290.3	377.5	264.8	252.1	239.4	226.6	213.9	201.2
													383.0	122.0	116.9	111.7	106.6	101.5	96.4	91.2	86.1
														488.0	321.0	307.5	294.0	280.5	267.1	253.6	240.1
															786.0	112.0	106.7	101.5	96.2	90.9	85.7
																863.5	157.0	151.0	145.1	139.1	133.1
																	979.7	103.0	99.5	96.0	92.5
																		1036.0	311.0	295.8	280.5
																			1296.7	250.0	239.2
																				1481.2	210.0
																					1614.9

Annual Depreciation Rates:

Inv. 1947-1956 = 4.2%
Inv. 1957 = 4.0%
Inv. 1958-1960 = 4.2%
Inv. 1961 = 4.7%
Inv. 1962 = 3.8%
Inv. 1963 = 3.4%
Inv. 1964 = 4.9%
Inv. 1965 = 4.3%
(Inv 1966 = 3.9%)

TABLE LV (Continued)

39. Miscellaneous Industries. Total Investment $O_{10} + U_{10}$ at Constant Prices. Post-War Investments Only.

1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.6	0.5	0.5	0.4	0.3	0.3	0.2	0.2	0.1	-	-	-	-	-	-
1.0	4.0	3.8	3.5	3.3	3.0	2.8	2.6	2.3	2.1	1.8	1.6	1.4	1.1	0.9	0.6	0.4	0.2	-	-	-	-
	4.9	9.0	8.5	7.9	7.3	6.8	6.3	5.8	5.2	4.7	4.1	3.6	3.1	2.5	2.0	1.4	0.9	0.4	-	-	-
		13.7	21.0	19.7	18.5	17.2	16.0	14.7	13.4	12.2	10.9	9.7	8.4	7.1	5.9	4.6	3.4	2.1	0.8	-	-
			33.8	57.0	53.6	50.2	46.7	43.3	39.9	36.5	33.1	29.6	26.2	22.8	19.4	16.0	12.5	9.1	5.7	2.3	-
				88.7	108.0	101.5	95.0	88.6	82.1	75.6	69.1	62.6	56.2	49.7	43.2	36.7	30.2	23.8	17.3	10.8	4.3
					191.2	78.0	73.3	68.6	64.0	59.3	54.6	49.9	49.2	40.6	35.9	31.2	26.5	21.8	17.2	12.5	7.8
						257.1	82.0	77.1	72.2	67.2	69.3	57.4	52.5	47.6	42.6	37.7	32.8	27.9	23.0	18.0	13.1
							322.5	78.0	73.3	68.6	64.0	59.3	59.6	49.9	45.2	40.6	35.9	31.2	26.5	21.8	17.2
								378.9	58.0	54.5	51.0	47.6	44.1	40.6	37.1	33.6	30.2	26.7	23.2	19.7	16.2
									410.7	50.0	47.0	44.0	41.0	38.0	35.0	32.0	29.0	26.0	23.0	20.0	17.0
										430.8	47.0	69.6	65.1	60.7	56.2	51.8	47.4	42.9	38.5	34.0	29.6
											472.0	136.0	127.4	118.9	110.3	101.7	93.2	84.6	76.0	67.4	58.9
												571.0	23.0	21.7	20.3	19.0	17.7	16.3	15.0	13.7	12.3
													548.1	42.0	39.6	37.1	34.7	32.2	29.8	27.4	24.9
														543.2	42.0	39.6	37.1	34.7	32.2	29.8	27.4
															535.4	11.0	10.4	9.7	9.1	8.5	7.9
																494.4	14.0	13.2	12.4	11.6	10.7
																	446.1	19.0	17.9	16.9	15.9
																		421.6	26.0	24.5	23.0
																			393.6	44.0	41.6
																				382.9	22.0
																					349.8

Annual Depreciation Rates:

Inv. 1945-1956 = 6.0%
Inv. 1957 = 6.3%
Inv. 1958-1960 = 5.8%
Inv. 1961 = 5.7%
Inv. 1962 = 5.8%
Inv. 1963 = 5.5%
Inv. 1964 = 5.7%
Inv. 1965 = 5.4%
(Inv. 1966 = 4.6%)

C. Calculation of Net Capital Stock

I now consider the specification of the capital input in a production process as a stock, rather than as a flow variable. The measure of capital stock as a quantity index of capital input is introduced as a way of determining the annual flow of capital services. The concept of net capital stock is used in the present context.(1) All previous investments with further useful life are included, and a measure of the reduction in the real services and the economic usefulness of the capital is taken into account. All calculations of depreciation take account of the rate of obsolescence of existing capital stock in the sense that the flow of capital services declines relative to the services of more recent investments. Obsolescence determines the level of depreciation rates as it also determines the marginal efficiency of capital.(2) Therefore depreciation includes a measure of uneconomic use of capital goods in production even when the capital good itself is physically capable of producing. It accounts as a result for any technological obsolescence because of production, process, or product innovation, and for any consumer demand-shift or supply-shift (in labour-force or raw-materials) obsolescence. We note that often the accounting depreciation allowance granted by fiscal measures does not reflect the physical life expectancy of the capital good, and that the economic life could well differ from either. Financial cash-flow considerations for replacement could also distort all other considerations.

(1) Edward F. Denison: "Theoretical Aspects of Quality Change, Capital Consumption, and Net Capital Formation", in Problems of Capital Formation: Concepts, Measurement, and Controlling Factors, Conference in Income and Wealth, National Bureau of Economic Research, New York, 1957, pp. 215 ff.

(2) R. Brandis: "Obsolescence and Investment", Journal of Economic Issues, 1, 1967, p. 171 ff.

Net capital stock in this context denotes an array of capital instruments of increasing age and "a contrario" of decreasing efficiency. With "quasi-rent" profits depending on the difference between the efficiency of new capital and of the marginal stock still in use to meet current demand, the steepness of a depreciation policy would determine in its reflection of efficiency the profit rate estimates. Some of the equipment and structures enter our calculations under different alternative uses and the actual calculation is easier when we use the perpetual inventory method. With old stocks virtually depreciating away there is no need to refer to historic investment and stock series but for a few long-lived assets, namely structures.(1) Replacement cost accounting would of course be a much preferable technique, but little information is available for such a synthetic approach in Greece at the moment.

Straight-line depreciation, assuming a life-time for the asset and writing off by uniform amounts each year was preferred to a diminishing balance depreciation; in the latter method some portion of the original investment always remains in the calculation however long the period. The soundest practice in assessing depreciation rates would be to approximate the rates that the collective experience of tax officials and firm accountants suggest. At those rates, structures and other assets would probably be assigned to inferior uses or would lag behind the newly installed capital, with increasing maintenance costs and decreasing efficiency. The variance around the expected life-span of investments is made therefore on the basis of survival curves and equipment mortality tables, to distribute retirements by age. Age stands for declining value or use, in terms of life-expectancy, physical productivity etc.

If the market value of the existing stock is taken into account,

(1) Colin Clark: "Net Capital Stock", The Economic Record, December, 1970, p. 449 ff.

TABLE LVI

Pre-War Investment Capital Stock. Constant 1958 Prices

	20-22	23	24	25-26	27-28	29-32
1953	382	126	8	14	18	35
1954	344	111	7	12	16	30
1955	307	96	6	11	13	26
1956	269	81	5	9	11	22
1957	231	66	4	8	9	17
1958	193	51	3	6	6	13
1959	155	36	2	5	4	8
1960	118	21	1	4	2	4
1961	80	6	0	2	0	0
1962	42	0	0	1	0	0
1963	4	0	0	0	0	0
1964	0	0	0	0	0	0
1965	0	0	0	0	0	0
1966	0	0	0	0	0	0

	33	34	35-37	38	39
1953	34	12	106		61
1954	29	10	95		53
1955	25	9	83		45
1956	20	7	72		37
1957	16	6	60		29
1958	11	4	48		21
1959	6	3	37		13
1960	2	2	25		5
1961	0	0	14		0
1962	0	0	2		0
1963	0	0	0		0
1964	0	0	0		0
1965	0	0	0		0
1966	0	0	0		0

Note: All depreciation rates at the 1950-57 rate by sector. All estimates in million drachmas.

Source: R. Krengel and D. Mertens: Op.Cit., Table 30,p.72-3; Estimates converted to 1958 prices and subject to our 1950-57 average depreciation rate derived from Tables LIII and LV. Also see p. 165 in text.

then we are making market valuations not only of the current flow of productive services but of all future services of the capital stock. In this case we have a capital adjustment additional to the adjustment necessary because of capital consumption.(1) The measure of currently available flow of services being difficult to assess and the measure of future services much more so, we are left with the alternative of assessing deterioration depreciation only.

I decided to arrive at the depreciation rates by branch of the manufacturing industry from the breakdown of investments in plant, equipment and machinery. From the National Accounts methodology I obtained the estimates of depreciation for the industry. This is given as 7 per cent annually for machinery, 1.5 per cent for buildings, 5 per cent for other fixed capital goods (equipment, furniture, etc.) and 1 per cent for other constructions.(2) Each investment is then depreciated annually by a weighted average of depreciation rates depending on the breakdown of each individual investment in terms of plant, equipment and machinery. The columns of the depreciation matrix are then added up to give the annual weighted capital stock totals net of depreciation (see Table XXXI).

This routine was followed for the post-1945 investments. A different method was necessary for the poor-quality war-time and and pre-war investment estimates. The Krengel-Mertens estimates for this period(3) were converted to constant 1958 prices. The accuracy of this conversion is difficult to assess, given the rampant inflation of the war-time years. An average life-time of capital goods was estimated and corresponding depreciation rates were calculated. The pre-war stock surviving after 1953 was then computed in each case and is shown on Table LVI . Another estimate

(1) Zvi Griliches: "Capital Stock in Investment Functions: Some Problems of Concept and Measurement", Christ etc., Eds.: Measurement in Economics, Stanford Univ.Press, 1963, Ch. 5, p. 118.
(2) Ministry of Coordination, National Accounts Direction: Investments in Greece During the Years 1948-62, Athens, 1966, p. 38.
(3) R. Krengel and D. Mertens: Op.cit., Table 30, p. 72-3.

TABLE LVII

Net Capital Stock, Including Prewar, Wartime, and Post-War Investment. In m. drachmas, const. 58 pr.

YEAR	20-22	23	24	25-26	27-28	29-32
1953	1583	2682	46	169	646	1730
1954	1546	2617	49	176	646	1888
1955	1678	2616	54	176	660	1934
1956	1785	2610	58	177	672	2060
1957	2019	2605	60	229	695	2270
1958	2432	2662	108	263	708	2307
1959	2627	2637	139	283	696	2688
1960	2768	2614	203	319	714	2735
1961	3474	2607	239	336	794	2643
1962	3903	2581	240	341	792	2741
1963	4242	2537	262	375	962	2784
1964	4385	2991	322	524	975	2764
1965	4797	3143	352	620	1121	4606
1966	5149	3243	381	652	1360	4605

YEAR	33	34	35-37	38	39
1953	450	196	1116	49	444
1954	517	289	1190	56	464
1955	685	322	1198	59	476
1956	904	411	1234	66	511
1957	980	376	1354	84	599
1958	1025	420	1464	383	568
1959	1095	442	1497	488	556
1960	1117	465	1508	786	540
1961	1134	606	1548	863	494
1962	1303	1086	1563	980	446
1963	1518	1187	1662	1036	422
1964	1807	1158	1884	1297	394
1965	2038	2858	2115	1481	383
1966	2330	3103	2441	1615	350

Note: Post-1945 estimates from Table LV.
Pre-1940 estimates from Table LVI.
War-time stock calculated from Krengel-Mertens Investment estimates, converted from constant 1954 to constant 1958 prices.

was then made of the surviving stock from the scanty war-time investments. This too was hampered by the difficulty of evaluating in real terms assets of that period of time and by the difficulty of assessing the extensive war damages.

The estimates of net capital stock for the post-war, war-time and pre-war period are added together to give the total surviving stock by branch of the industry. Those final estimates are given on Table LVII .

The method of depreciation employed, because of the dissaggregation in sub-groups of plant, equipment, machinery, etc., is similar in concept to the "Equal Life Group Plan" method of depreciation, the ultimate refinement of the straight-line method of depreciation-rate determination.(1) Ideally one would have liked an even more detailed disaggregation of our entries in more groups, so that the properties of the longer-lived assets (plant etc.) are not applied to shorter-lived units (e.g. machinery) and the operations of the latter are not charged with a combined average cost for the period under consideration. In my own version each vintage is weighted separately in its components and the charge is applied to assets of different life-expectancy, so that each vintage has a different depreciation rate, a weighted average of the summation of the percentages of the respective component depreciation rates.

(1) L.I. Szabo and G.G. Hunter: "Equal Life Group Method of Depreciation Rate Determination", The Engineering Economist, Vol. 12, No. 2, Winter 1966.
L.I. Szabo and G.G. Hunter: "Equal Life Group Method of Depreciation: Part II, Straight-Line Method of Cost Allocation for Integrated Properties", Ibid. Vol. 12, No. 3, Spring 1967, pp. 129, 130, 134 ff.

D. The Labour Input

There do not exist consistent time series of man-power statistics to cover the Greek manufacturing industry by sector for the entire period up to 1966. Enough nevertheless exists on which to base estimates for the period 1958-1966. Even for the period before 1958 one could find find some scattered and sometimes not entirely consistent sources of information. For the year 1951 we have the evidence of the 1951 Population Census.(1) The shortcomings of the Census are that the evidence was that of the census date and not an annual average, and also that the methodology of the 1951 census differs from the one employed in compiling subsequent surveys, mainly in the exclusion of female labour force in the 1951 enumeration and the counting of army recruits under their former occupations. Evidence of the 1950 Census of manufacturing and commercial establishments can be used to eliminate some of the shortcomings and modify the estimates.(2) A third source of information is the sample of mainly large-scale industries issued annually by the Federation of Greek Industries since 1951 completes the range of available information from this early period.(3) This sample comprised in 1951 when initially selected of the largest and more important firms in each branch and a considerable number of smaller ones. With time, since the sample only comprised the same initial firms, it started losing its indicative power as it no longer reflected accurately the movements in labour force absorption by branch of the industry.

More regular and reliable information comes with the 1958 Survey labour estimates, reported for the 27th of November 1957 for a total of 760 major firms,(4) the total of all firms employing over 10 factory and administrative personnel. Additional information

(1) National Statistical Service: Results of the Population Census of 7 April 1951, Vol. I, Table 11-12; Vol. III, Table 9.
(2) National Statistical Service: Census of Manufacturing and Commercial Establishments, Athens, 1951.
(3) Federation of Greek Industries: The State of the Greek Industry in 1953; 1954-1955; 1958, (In Greek), Athens, 1954-59.
(4) National Statistical Service: Results of the Industrial Survey of the Year 1958, Athens 1959 & 1961, Publication L:2, Industry.

comes from the 1958 Census of manufacturing, artisan and commercial establishments, covering all small-scale and large-scale industry.

The annual survey of the industry provides estimates of employment in all large-scale industries for the years 1958 to 1962 inclusive. This is reliable census material and offers an excellent measure of the changing pattern of employment in all industrial branches.(1) The sample of industries of the Federation of Greek Industries continues and even expands in number of firms, but is not preferred to the much more reliable Survey findings. Furthermore unemployment figures are available for this period,(2) and so are emigration statistics by branch of the industry (depending on the industrial employment of emigrants),(3) giving a further insight into the developments in the labour-input. Additional evidence comes from the 1961 population Census, with a complete set of labour data available by branch of the industry, based on a sample occupational distribution from the Census.(4) Those figures had to be reconsidered for a number of industries (branches 20-22, 24, 35-37 in particular, but others as well) because of the need of seasonal adjustment and in the light of subsequent information mainly from the annual industrial Surveys (the 1963 one in particular). Tentative estimates for groups of branches of the industry, including both small- and large-scale establishments for the year 1959, worked out by the National Statistical Service were also reviewed, given not only the high error margins allowed by the compilers, but also their incompatibility with other estimates.(5)

Additional information we derive from the 15-Year Development Programme of Greece, which gives us estimates of total manufacturing

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(1) N.S.S.G.: Results of the Industrial Survey of the Year 1958, Athens, 1959; Results of the 1958 Annual Industrial Survey, 1961; Results of the 1959 Annual Industrial Survey, 1962; Results of the 1960 Annual Industrial Survey, 1962; 1961 Annual Industrial Survey and Survey on Gross Investment for 1958-60, 1963; 1962 Annual Industrial Survey, 1964.

(2) N.S.S.G.: Monthly Statistical Bulletin, March 1958-May 1967, Group 7-8.

(3) N.S.S.G.: Statistical Yearbook of Greece, Various Issues.

(4) N.S.S.G.: Census of Manufacturing, Artisan and Commercial Establishments of 1958, Athens, 1960, Publ. L:1, L:3.

(5) N.S.S.G.: 1959 Survey, Op.cit., pp. 14-15.

TABLE LVIII

Manufacturing Industry Labour Input

	20-22 Food Drink Tobacco	23 Textiles	24 Clothing Footwear	25-26 Wood Cork Furniture	27-28 Paper Printing	29-32 Leather-Rubber Plastics Chemicals-Petrol
1958	105 959	53 346	67 261	44 935	14 443	23 852
1959	108 473	48 150	64 267	48 138	15 218	25 738
1960	103 360	48 805	63 676	50 937	16 218	27 087
1961	100 661	49 500	63 009	50 018	17 787	30 422
1962	97 206	51 002	63 735	50 463	19 163	29 074
1963	109 733	55 759	70 010	45 756	19 573	31 322
1964	114 218	57 307	78 908	46 961	20 076	32 339
1965	111 834	57 882	75 328	47 929	21 051	34 927
1966	114 437	58 939	72 412	47 940	21 701	35 886

	33 Non-metallic Minerals	34 Basic Metal Industries	35-37 Metal Products Machinery Electr. Equips.	38 Tranport Equipment	39 Miscellaneous Industries
1958	22 421	1 910	51 739	22 844	4 929
1959	25 401	1 911	52 528	20 486	5 964
1960	29 256	2 038	53 425	23 128	6 177
1961	29 190	2 086	57 213	25 664	6 062
1962	31 748	2 199	63 296	27 230	7 066
1963	32 491	2 946	64 247	25 945	8 234
1964	33 831	2 695	68 533	26 265	8 129
1965	34 748	3 330	69 849	26 962	8 527
1966	35 056	4 542	69 588	26 684	8 668

Note : 1959 to 1962 entries estimated.
For large-scale establishment employement see N.S.S.G.: Industrial Survey, Op.cit., for the years 1958 to 1962. 1963 large-scale establishment estimates from N.S.S.G.: Annual Industrial Survey for the Year 1963, L:16, Industry, Athens, 1967.
1958-1962 Large-scale establishment employment estimates also given in R.Krengel and D.Mertens: Fixed Capital Stock etc., Op.cit., p. 46.
For method of derivation of estimates see text.

industry manpower estimates on an annual basis for all the post-war years.(1)

Entries for the years 1963 to 1966 are taken from the findings of the annual Surveys, providing complete coverage for small-scale and large-scale industries as well.(2)

With the 1958 and 1963 breakdown as a base for all industry (including small-scale and large-scale establishments), we calculate the intermediate years using as an indicator as to the direction of annual changes above or below the trend values the annual changes in the Survey census estimates. The findings are then reduced or increased proportionally to given (by the 15-year programme) industry totals. Few alterations only were brought about in the light of information contained on sources (2) to (5) on the previous page and they do not affect the general pattern of individual industries.

Full results are found on Table LVIII, covering the years 1958 to 1966.

(1) Ministry of National Economy: Fifteen-Year Plan of the Greek Economy. Athens, 1971.

(2) National Statistical Service: Annual Industrial Survey of the Year 1963. L:16. Industry, Athens, 1967; 1964. Athens. 1968; 1965, Athens, 1969; 1966. Athens, 1969.

TABLE LIX

Derivation of Profits by Branch of the Manufacturing Industry : 1958-1966 - Stage One.

	1	2	3	4	5	6	7	8	9
	Sample Gross Capital Stock: in Million Drachmas at Current Prices (given by F.G.I. in a more disaggregated form)	Sample Total Depreciation Cumulated Over Time: in Million Drachmas at Current Prices (given in a more disaggregated form)	Sample Net Capital Stock: in Million Drachmas at Current Prices (derived)	Sample Current-Period Depreciation: in Million Drachmas at Current Prices (given in a more disaggregated form)	Sample Total Depreciation as Share of Sample Net Capital Stock (calculated)	N.S.S. Industry Total Depreciation as Share of N.S.S. Industry Net Capital Stock (calculated)	N.S.S. Industry/ F.G.I. Sample Depreciation Differentials (calculated)	Corrected F.G.I. Sample Total Depreciation: in Million Drachmas at Current Prices (recalculated true F.G.I. depreciation)	Corrected F.G.I. Sample Net Capital Stock: in Million Drachmas at Current Prices (recalculated true F.G.I. net capital stock)
20-22									
1958	2 197.5	1 274.4	923.1	117.4	.12718	.05238	.41149	1 394.9	1 309.4
1959	2 352.3	1 331.4	1 020.9	109.6	.10735	.05835	.54334	1 582.9	1 424.5
1960	2 631.0	1 467.5	1 163.5	133.8	.11500	.06142	.53391	1 740.6	1 608.3
1961	2 720.0	1 453.4	1 266.6	130.1	.10272	.05322	.51801	2 385.6	1 707.2
1962	3 956.3	1 814.5	2 141.8	160.2	.07480	.06016	.80455	3 055.0	2 691.8
1963	4 345.0	1 910.2	2 434.8	149.1	.06124	.06169	*	3 534.9	3 013.8
1964	4 661.0	2 072.0	2 589.0	168.0	.06489	.06643	*	4 115.0	3 217.1
1965	5 112.0	2 377.0	2 735.0	240.9	.08808	.06525	.74091	4 579.0	3 455.5
1966	5 724.0	2 728.0	2 996.0	289.9	.09676	.06669	.68873	4 902.0	3 822.9
23									
1958	2 542.8	1 403.7	1 139.1	110.2	.09674	.08332	.86143	2 343.9	1 154.4
1959	2 477.3	1 329.2	1 148.1	87.1	.07586	.09025	*	2 373.1	1 163.4
1960	2 738.5	1 513.7	1 224.8	140.0	.11430	.09832	.86002	2 786.2	1 259.7
1961	2 653.3	1 479.3	1 174.0	148.9	.12683	.10088	.79495	2 818.2	1 239.4
1962	3 076.6	1 763.5	1 313.1	187.4	.14272	.10845	.75964	3 378.4	1 423.6
1963	3 340.2	1 685.6	1 654.6	178.9	.10812	.09983	.92322	3 814.6	1 778.8
1964	4 005.0	1 832.0	2 173.0	183.8	.08458	.10598	*	4 198.0	2 297.2
1965	4 518.0	2 057.0	2 461.0	227.1	.09228	.11002	*	4 841.0	2 585.2
1966	4 894.0	2 220.0	2 674.0	247.5	.09256	.11286	*	6 436.0	2 798.2

TABLE LIX
(Continued)

	1	2	3	4	5	6	7	8	9
24									
1958	21.0	12.7	8.3	0.3	.03614	.04259	*	5.1	8.5
1959	6.1	2.0	4.1	0.0	.00000	.05396	*	5.3	8.3
1960	3.8	1.3	2.5	0.0	.00000	.04926	*	3.5	4.1
1961	7.2	2.9	4.3	0.8	.18605	.05816	.31237	23.2	5.1
1962	78.5	18.0	60.5	9.2	.15207	.07083	.46579	85.9	65.6
1963	80.6	29.1	51.5	4.8	.09320	.06794	.72854	111.7	59.7
1964	133.0	44.0	89.0	6.7	.07528	.06273	.83378	162.0	101.4
1965	86.0	28.0	58.0	5.3	.09139	.06903	.75575	193.0	65.9
1966	102.0	30.0	72.0	6.9	.09583	.07218	.75261	293.0	80.4
25-26									
1958	52.1	25.0	27.1	3.4	.12546	.05970	.47528	58.0	31.2
1959	41.3	22.7	18.6	2.7	.14516	.06396	.44039	26.5	22.3
1960	37.7	22.0	15.7	2.9	.18471	.06207	.33568	51.4	19.3
1961	53.5	28.3	25.2	3.1	.12302	.06994	.56829	60.4	29.9
1962	99.4	36.3	63.1	4.9	.07765	.07243	.93299	160.5	69.1
1963	136.2	39.4	96.8	4.7	.04855	.06987	*	225.4	103.3
1964	243.0	45.0	198.0	6.7	.03384	.05572	*	307.0	205.4
1965	331.0	72.0	259.0	19.4	.07490	.06274	.08371	482.0	270.9
1966	451.0	108.0	343.0	28.4	.08280	.06902	.83333	578.0	360.9
27-28									
1958	379.1	233.4	145.7	16.9	.04736	.07966	*	251.1	145.7
1959	484.6	252.6	232.0	25.7	.11078	.08649	.78139	464.5	237.6
1960	552.6	280.4	272.2	39.8	.03600	.08894	*	525.9	272.2
1961	651.2	294.0	357.2	49.2	.13774	.08501	.61728	647.9	381.6
1962	902.4	344.8	557.6	52.3	.09380	.09722	*	899.9	557.6
1963	1 080.1	387.4	692.7	64.2	.09268	.08451	.91253	1 008.4	722.7
1964	1 502.0	497.0	1 005.0	110.6	.11005	.10277	.93364	1 318.0	1 042.3
1965	1 785.0	608.0	1 177.0	110.6	.09397	.08733	.92971	1 634.0	1 222.1
1966	2 047.0	689.0	1 358.0	90.3	.06650	.08228	*	1 992.0	1 358.0

TABLE LIX
(Continued)

	1	2	3	4	5	6	7	8	9
29-32									
1958	1 976.7	1 179.6	797.1	120.8	.15155	.07867	.51881	1 643.0	855.2
1959	2 129.5	1 358.0	771.5	171.6	.22242	.07210	.32419	1 610.8	945.6
1960	2 225.5	1 457.9	767.6	121.3	.15802	.08263	.52278	1 711.5	999.6
1961	2 575.0	1 567.8	1 007.2	110.5	.10971	.09130	.83227	1 822.3	1 257.7
1962	3 412.8	1 907.8	1 505.0	95.7	.06359	.09121	*	2 458.8	1 505.0
1963	4 062.6	1 922.9	2 139.7	118.2	.05524	.09522	*	3 018.5	2 139.7
1964	5 463.0	2 062.0	3 401.0	162.5	.04778	.10152	*	4 337.0	3 401.0
1965	9 904.0	2 334.0	7 570.0	202.7	.02678	.06279	*	6 897.0	7 570.0
1966	11 257.0	2 611.0	8 646.0	275.8	.03190	.08595	*	9 010.0	8 646.0
33									
1958	1 106.9	716.9	390.0	93.3	.23923	.07990	.33403	394.3	738.1
1959	1 272.9	850.4	422.5	79.7	.13864	.06511	.34517	415.5	835.4
1960	1 368.5	926.1	442.4	87.4	.19756	.07896	.39949	465.2	892.1
1961	1 522.3	1 031.7	490.6	68.8	.18100	.08360	.46188	551.1	991.6
1962	1 686.7	1 045.4	641.3	101.1	.15765	.07713	.48921	740.2	1 148.9
1963	2 187.2	1 168.3	1 018.9	125.1	.12278	.07549	.61532	1 080.3	1 586.2
1964	2 640.0	1 300.0	1 340.0	155.8	.11627	.07316	.62909	1 265.0	1 971.3
1965	3 131.0	1 512.0	1 619.0	178.7	.11038	.07512	.68087	1 537.0	2 353.2
1956	3 632.0	1 685.0	1 947.0	210.7	.10822	.07309	.67560	1 878.0	2 765.2
34									
1958									
1959									
1960									
1961									
1962	1 335.9	361.9	974.0	6.0	.00616	.04484	*	1 186.6	974.0
1963	1 725.7	412.3	1 313.4	31.4	.02391	.07077	*	1 532.7	1 313.4
1964	3 400.0	516.0	2 884.0	88.0	.03051	.08221	*	2 511.0	2 884.0
1965	5 703.0	607.0	5 096.0	19.8	.00389	.03425	*	4 736.0	5 096.0
1966	6 681.0	738.0	5 943.0	88.9	.01496	.07067	*	6 059.0	5 943.0

TABLE LIX
(Continued)

	1	2	3	4	5	6	7	8	9
35-37									
1958	1 530.9	651.6	879.3	39.1	.01447	.06414	*	1 683.2	879.3
1959	1 207.9	532.4	675.5	40.5	.05996	.07001	*	1 473.0	675.5
1960	2 176.6	892.0	1 284.6	54.9	.04274	.07414	*	2 705.3	1 284.6
1961	2 546.0	956.8	1 589.2	70.2	.04417	.07623	*	3 375.8	1 589.2
1962	3 612.4	1 088.7	2 523.7	90.6	.03590	.08049	*	4 456.5	2 523.7
1963	1 358.5	534.4	824.1	97.3	.11807	.08038	.68051	2 002.1	855.2
1964	1 679.0	648.0	1 031.0	112.3	.10892	.07712	.70799	2 508.0	1 094.9
1965	2 027.0	706.0	1 321.0	151.8	.11491	.07797	.67798	2 833.0	1 433.8
1966	2 753.0	807.0	1 946.0	209.2	.10750	.07542	.70139	3 740.0	2 121.3
38									
1958									
1959									
1960									
1961									
1962	887.7	85.0	802.7	20.5	.02554	.04163	*	1 381.7	802.7
1963	1 039.8	109.4	930.4	26.1	.02805	.04508	*	1 533.7	930.4
1964	1 236.0	108.0	1 128.0	29.3	.02598	.03978	*	1 821.0	1 128.0
1965	1 322.0	141.0	1 181.0	34.1	.02887	.04423	*	1 965.0	1 181.0
1966	1 406.0	174.0	1 232.0	41.2	.03344	.04724	*	1 997.0	1 232.0
39									
1958									
1959									
1960									
1961									
1962	45.1	25.5	35.8	1.8	.05028	.13969	*	23.6	35.8
1963	52.6	27.5	25.1	0.4	.01594	.10308	*	23.0	25.1
1964	69.0	31.0	38.0	0.3	.00789	.13706	*	35.0	38.0
1965	81.0	32.0	49.0	1.0	.02041	.14282	*	42.0	49.0
1966	86.0	38.0	48.0	0.9	.01875	.15743	*	60.0	48.0

TABLE LX

Derivation of Profits by Branch of the Manufacturing Industry : 1958-1966 - Stage Two.

	1	2	3	4	5	6
	F.G.I. Sample Current Period Depreciation x Depreciation Differentials (disguised profits)	F.G.I. Sample Financing Expenses (including interest and rents)	F.G.I. Sample Net Profits (given at current prices)	F.G.I. Sample Total Profits (at current prices)	F.G.I. Sample Total Profits as Share of Corrected F.G.I. Sample Net Capital Stock	F.G.I. Sample Profits/Net Capital Stock Ratio x N.S.S. Total Industry Net Capital Stock (= total industry profits at constant 1958 prices)
20-22						
1958	69.1	50.7	82.5	202.3	.15449	375 739
1959	50.1	57.5	100.1	207.7	.14581	383 032
1960	62.3	63.2	136.2	261.7	.16272	450 403
1961	62.7	86.7	82.0	231.4	.13554	470 880
1962	31.3	111.0	121.5	263.8	.09800	382 498
1963	*	143.4	109.9	253.3	.08405	356 527
1964	*	169.9	70.4	240.3	.07469	327 538
1965	62.4	125.9	225.3	413.6	.11969	574 167
1966	90.2	176.5	280.3	547.0	.14308	736 745
23						
1958	15.3	118.9	8.7	142.9	.12379	329 521
1959	*	120.3	21.7	142.0	.12206	321 862
1960	19.6	141.3	83.0	243.9	.19362	506 117
1961	30.5	142.9	72.0	244.8	.19752	514 921
1962	45.1	171.3	159.4	375.8	.26398	681 330
1963	13.7	168.6	215.5	397.8	.22363	656 813
1964	*	187.1	207.1	394.2	.17160	313 256
1965	*	276.0	214.8	490.8	.18985	596 699
1966	*	310.3	277.5	587.8	.21006	681 238

TABLE IX
(Continued)

	1	2	3	4	5	6
24						
1958	*	0.2	-0.5	-0.3	-.03529	-3 812
1959	*	0.2	0.1	0.3	.03614	5 024
1960	*	0.1	0.1	0.2	.04878	9 902
1961	0.6	0.7	5.4	6.7	1.00000 x	239 000 xx
1962	4.9	2.7	24.5	32.1	.48933	117 439 xx
1963	1.3	3.6	33.7	38.6	.64657	169 400 xx
1964	1.1	5.4	42.4	48.9	.48225	155 284 xx
1965	1.3	5.7	16.6	23.6	.35812	126 058 xx
1966	1.7	8.7	37.8	48.2	.59950	228 410 xx
25-26						
1958	1.8	2.3	0.8	4.9	.15705	41 304
1959	1.5	1.1	1.5	4.1	.18386	52 032
1960	1.9	2.1	12.7	16.7	.86528	276 026
1961	1.3	2.5	18.2	22.0	.73579	247 224
1962	0.3	6.5	18.4	25.2	.36469	124 359
1963	*	8.6	8.2	16.8	.16263	60 987
1964	*	11.8	14.4	26.2	.12756	66 839
1965	3.2	21.0	12.2	36.4	.13437	83 308
1966	4.7	24.4	27.4	56.5	.15655	102 073
27-28						
1958	*	9.2	15.7	24.9	.17090	120 996
1959	5.6	17.0	26.5	49.1	.20665	143 828
1960	*	19.3	46.5	65.8	.24173	172 598
1961	18.8	23.8	21.6	64.2	.16824	133 582
1962	*	33.0	14.3	47.3	.08483	67 184
1963	5.6	40.8	45.1	91.5	.12661	121 798
1964	7.3	57.1	14.3	78.7	.07551	73 618
1965	7.8	50.2	45.4	103.4	.08461	94 846
1966	*	64.1	38.7	109.6	.08071	109 762

TABLE LX
(Continued)

	1	2	3	4	5	6
29-32						
1958	58.1	53.1	17.1	128.3	.15002	346 103
1959	116.0	52.0	44.4	212.4	.22462	603 776
1960	57.9	55.3	56.0	169.2	.16927	462 948
1961	18.5	58.8	84.1	161.4	.12833	339 173
1962	*	79.4	100.6	180.0	.11960	327 826
1963	*	115.5	94.2	209.7	.09800	272 843
1964	*	184.2	114.9	299.1	.08795	243 080
1965	*	133.9	154.5	288.4	.03810	175 479
1966	*	261.7	150.7	412.4	.04770	219 649
33						
1958	62.1	16.9	40.2	119.2	.16149	167 401
1959	52.2	17.8	34.7	104.7	.12533	136 447
1960	52.5	19.9	38.6	111.0	.12487	139 484
1961	47.8	23.6	41.6	113.0	.11396	129 227
1962	51.6	31.7	52.0	135.3	.11776	153 448
1963	48.1	42.0	69.9	160.0	.10087	153 121
1964	57.8	49.9	89.0	196.7	.09978	180 306
1965	57.0	63.5	137.3	257.8	.10955	223 269
1966	68.3	97.3	172.8	338.4	.12238	285 141
34						
1958						
1959						
1960						
1961						
1962	*	26.1	8.7	34.8	.03573	38 802
1963	*	53.5	17.0	70.5	.05368	63 715
1964	*	66.0	19.0	85.0	.02947	34 130
1965	*	64.6	10.6	75.2	.01476	42 176
1966	*	80.6	-12.1	68.5	.01153	35 765

TABLE LX
(Continued)

	1	2	3	4	5	6
35-37						
1958	*	72.5	18.1	90.6	.10304	150 846
1959	*	63.4	41.7	105.1	.15559	232 915
1960	*	116.5	90.8	207.3	.16137	243 350
1961	*	145.4	89.8	235.2	.14800	229 102
1962	*	191.9	169.3	361.2	.14312	223 701
1963	31.1	85.4	160.3	276.8	.32367	537 935
1964	32.8	105.2	187.8	325.8	.29756	560 605
1965	48.9	125.8	210.7	385.4	.26880	568 504
1966	62.5	166.6	315.1	544.2	.25654	626 217
38						
1958						
1959						
1960						
1961						
1962	*	64.4	83.9	148.3	.18475	181 056
1963	*	67.8	117.9	185.7	.19959	206 777
1964	*	85.2	113.5	198.7	.17615	228 469
1965	*	96.0	130.9	226.9	.19213	284 537
1966	*	93.8	160.6	254.4	.20649	333 488
39						
1958						
1959						
1960						
1961						
1962	*	0.3	9.3	9.6	.26816	119 598
1963	*	0.1	12.6	12.7	.50598	213 522
1964	*	0.4	12.1	12.5	.32895	129 605
1965	*	0.7	13.8	14.5	.29592	113 337
		0.7	8.9	9.6	.20000	70 000

Note : x - estimate adjusted downwards. xx - final adjusted estimates given on p. 178.

E. Derivation of Factor Shares

a. Profits.

To arrive at an estimate of annual profits by sector of the industry, given the absence of relevant information in Survey material it is necessary as a first step to look at the alternative source of information, the sample of industries of the Federation of Greek Industries. This sample comprised of a number of firms originally selected in 1951. The number of firms investigated started increasing rapidly by 1958 and the inquiry extended to all corporations and limited liability companies on the value of their capital investment in all types of capital assets (land, buildings, machinery and equipment, other technical installations, tools, trasportation means etc.), the depreciation of their assets, the liabilities and their profit and loss account.

What is important to note in relation to this sample is that it does not follow the National Statistical Service methodology. The sample of industries expands (or sometimes contracts) on the somewhat arbitrary grounds of availability of information and other such expediencies, so that one should be careful not to interpret for instance an increase in the capital stock from one period to the next as indicating a true increase for the economy. On the other hand one is able to calculate the level and relative importance of the profit and loss entries against a capital stock estimate of the same period. As the sample is large enough (at the end of the period not much inferior to the grand total of the Survey based on census material) and varied enough (in terms of size of firms), it was decided that the annual profit rates derived from the sample could be applied to the entire sector of the industry. The same method has been used by Krengel in his study of productivity and technical change in the German manufacturing industry[1] and others.

(1) Rolf Krengel: "Measurement of Total Factor Input, Technical Change and Output by Industry in the Federal Republic of Germany, 1958-68", Review of Income and Wealth, June 1972, p. 176.

A much more important feature of the F.C.I. sample is that it is subject to a different structure of depreciation rates from that adopted by the National Accounts methodology. Clearly one can distinguish between economic, financial and legal (tax) depreciation. The three rates can sometimes differ widely. We have seen the range of depreciation rates employed by the National Accounts earlier in this chapter. Those rates I adopted for the construction of the net capital stock by sector of the manufacturing industry. Those rates are given as 7 per cent annually for machinery, 1.5 per cent for buildings, 5 per cent for other fixed capital goods and 1 per cent for other constructions. The higher rates allowed by the tax incentive legislation are seen as a concession which effectively disguises profits. The extent of the depreciation differential is seen when we set the above rates against the legal depreciation rates of 8 per cent for industrial equipment, 6 per cent for electricity producing equipment, 12.5 per cent for internal combustion engines, 12 per cent for light vehicles, 20 per cent for lorries, 20 per cent for furniture, 5 per cent for industrial buildings and 3 per cent for other buildings.(1) Those rates are increased for investments which took place after the 22nd October 1947 by 2.5 per cent for buildings and 6 per cent for other equipment. Additionally for industies in the provinces (depressed areas) the depreciation is twice the above rate of regular and additional depreciation. And for industries established after the first of January 1958 the additional depreciation increases were up by 50 per cent.(2)

To bring the sample depreciation rates to the level of National Account rates a number of operations were necessary, all given in Table LIX (stage one), yielding a corrected current period depreciation estimate, a corrected total depreciation estimate from the

(1) Organisation of Industrial Development: General Review of Greek Industry, 6, General Studies, Athens 1962, pp. 126-27.
(2) Effectively such rates constitute a concealed subsidy.

beginning of the period and a corrected net capital stock estimate for the sample. On Table LX (stage two) we find in column 1 an estimate of all such "disguised profits", together with the net profits given for the sample in column 3. One additional profit item could be detected in the "financing" expenses (which include i.a. interest payments and rents). Those are not specifically profits strictly speaking for the firms considered in the sample, but are without any question profits accruing to other interests from the industry, so that on a national level they should be also counted together with normal profits. They are given in column 2.

The corrected grand total of sample profits is given in column 4, Table LX . Those profits as a proportion of the "corrected" net capital stock give us a measure, which applied on the grand total net capital stock for each sector (derived on National Accounts definitions from National Statistical Service data earlier in this chapter) gives an annual estimate of net profits for each sector of the manufacturing industry (Table LX , column 6), at constant 1958 prices.(1)

The method employed implies that the structure in terms of componenet items of the capital stock derived from N.S.S.G. data and that of the F.G.I. sample is the same, so that one could not attribute the higher depreciation rates in one sector to "disguised profits" when in fact it was a matter of a higher mechanical-equipment content in one case, accompanied by obviously higher depreciation rates when compared with (say) a higher building-structure content in another case. In other words we have to make certain that similar (or not too different) depreciation schedules correspond to similar real asset structures. A detailed examination of of the depreciation methodology in both cases reveals that the F.G.I. sample has a structure remarkably near that of the N.S.S.G.-derived stock. I present here a measure of the gross stock of mechanical equipment as proportion of total gross stock in the year 1963 for

(1) It is unfortunate that in branches 34, 38 and 39 the relevant Federation of Greek Industries information only covers the years 1962 to 1966.

both the Federation and the Statistical Service versions.(1)

Gross Mechanical Equipment Stock/ Total Gross Capital Stock

Year: 1963

ISIC Code	Federation-of-Greek-Industries Sample	National-Statistical-Service-derived estimates
20-22	0.5540	0.5507
23	0.7014	0.7022
24	0.2183	0.7797
25-26	0.5357	0.6393
27-28	0.7428	0.7056
29-32	0.5559	0.7124
33	0.7080	0.7258
34	0.7503	0.8479
35-37	0.6210	0.6140
38	0.4026	0.4034
39	0.6026	0.6879

It is easy to see that in branches 20-22, 23, 27-28, 33, 35-37 and 38 the structure of investments is the same in the two versions. In branches 25-26, 29-32, 34 and 39 the differences are larger, but were found to be smaller in the same test for previous or subsequent years or they diminished when differences in stocks of structures and equipment other than mechanical were taken into account, so that in the end the overall difference was below an arbitrary level of ten per cent and the structures were thought to be sufficiently near in specification so as not to distort the evidence on which the "disguised profits" calculations were based. In branch 24, nevertheless, a correction is necessary, despite the fact that in other years the discrepancy was not so pronounced: 0.4510 versus 0.7344 in the year 1966 for example. On the average therefore I decided to decrease the F.G.I. sample "current-period-depreciation x depreciation differentials" estimate by three quarters in the years 1961, 1962 and 1963, fifty per cent in the year 1964 and 1965 and by one third in the year 1966. This amounts to reducing the entries in Table LX column 1 for branch 24 in such proportions.

(1) Stock estimates were developed separately for mechanical equipment and for all stock, for both the N.S.S.G. and the F.G.I. sample.

The revised branch 24 estimates are given below and are used in my further analysis in this new form.[1] Profits as proportion of F.C.I. sample corrected-net-capital-stock for the year 1961 are also adjusted downwards to a rounded estimate.[2]

	F.C.I. Sample Current Period Depreciation x Depreciation Differentials: Corrected form (= disguised profits)	F.C.I. Sample Total Profits (at current prices)	F.C.I. Sample Total Profits as Share of Corrected F.C.I. Sample Net Capital Stock	F.C.I. Sample Profits/Net Capital Stock Ratio x N.S.S. Total Industry Net Capital Stock (= total industry profits at constant 1958 prices)
1958	*	-0.3	- .03529	- 3 812*
1959	*	0.3	.03614	5 024
1960	*	0.2	.04878	9 902
1961	0.2	6.3	1.00000	239 000
1962	1.2	28.4	.43445	104 268
1963	0.3	37.6	.62981	165 010
1964	0.6	48.4	.47732	153 697
1965	0.6	23.0	.34916	122 904
1966	1.2	47.7	.59328	226 039

In the next part I shall examine the factor distribution of income with particular reference to employee compensation.

(1) On the need of such correction see John H. Dunning and D.C. Rowan: "Inter-Firm Efficiency Comparisons: U.S. and U.K. Manufacturing Enterprises in Britain", J.H.Dunning, Ed., Studies in International Investment, Allen and Unwin, London, 1970, p. 370.

(2) There exist no other differential cost-valuation components in the two estimates due to different accounting conventions to further distort such shifts in profits estimates.

* Loss accounted for this particular year.

The revised branch 24 estimates are given below and are used in my further analysis in this new form.[1] Profits as proportion of F.G.I. sample corrected-net-capital-stock for the year 1961 are also adjusted downwards to a rounded estimate.[2]

	F.G.I. Sample Current Period Depreciation x Depreciation Differentials: Corrected Form (= disguised profits)	F.G.I. Sample Total Profits (at current prices)	F.G.I. Sample Total Profits as Share of Corrected F.G.I. Sample Net Capital Stock	F.G.I. Sample Profits/Net Capital Stock Ratio x Total Industry Net Capital Stock (= total industry profits at constant 1958 prices)
1958	*	-0.3	- .03529	- 3 812*
1959	*	0.3	.03614	5 024
1960	*	0.2	.04878	9 902
1961	0.2	6.3	1.00000	239 000
1962	1.2	28.4	.43445	104 268
1963	0.3	37.6	.62981	165 010
1964	0.6	48.4	.47732	153 697
1965	0.6	23.0	.34916	122 904
1966	1.2	47.7	.59328	226 039

In the next part I shall examine the factor distribution of income with particular reference to employee compensation.

(1) On the need of such correction see John H. Dunning and D.C. Rowan: "Inter-Firm Efficiency Comparisons: U.S. and U.K. Manufacturing Enterprises in Britain", J.H.Dunning, Ed., Studies in International Investment. Allen and Unwin, London, 1970, p. 370.

(2) There exist no other differential cost-valuation components in the two estimates due to different accounting conventions to further distort such shifts in profits estimates.

* Loss accounted for this particular year.

TABLE LXI

Labour Remuneration : Large-Scale Industries (Over 10 Employees) 1958-1962

Including Wages, Salaries and Working Proprietors' "Compensation"

O_{10}	Working Proprietors and non-paid Family Members	Paid Employees (given)	Wage-Earners (given)	Salary-Earners (given)	Total Employed (given)	Working Proprietor "Compensation" in Thou. Dr. (calculated)	Total Paid Employee Income in M. Dr. (given)	Wages in M. Dr. (given)	Salaries in M. Dr. (given)	Annual Salary per Salary-Earner (calculated)	Total O_{10} Remuneration (calculated)
	1	2	3	4	5	6	7	8	9	10	11
ISIC Code	1958										
20	1 710	22 779	18 469	4 310	24 489	53 164	414	280	134	31 090	
21	147	3 858	2 616	1 242	4 005	6 154	98	46	52	41 868	1 033 271
22	353	29 703	28 537	1 166	30 056	16 953	445	389	56	48 027	
23	1 038	44 748	40 374	4 374	45 786	43 191	778	596	182	41 610	821 191
24	949	10 912	10 004	908	11 861	18 813	158	140	18	19 828	176 813
25	503	3 906	3 618	288	4 409	10 479	56	50	6	20 833	143 423
26	331	4 373	4 140	233	4 704	9 944	67	60	7	30 043	
27	80	3 821	3 344	477	3 901	3 354	80	60	20	41 929	270 431
28	218	6 859	4 518	2 341	7 077	7 077	180	104	76	32 465	
29	139	2 776	2 473	303	2 915	5 046	54	43	11	36 304	
30	72	3 261	2 897	364	3 333	2 373	68	56	12	32 967	539 352
31	620	17 050	13 455	3 595	17 670	24 662	375	232	143	39 777	
32	8	384	266	118	392	271	10	6	4	33 898	
33	913	13 076	11 596	1 480	13 989	35 163	265	208	57	38 514	300 163
34	11	3 070	2 573	497	3 081	553	87	62	25	50 302	87 553
35	453	10 202	8 835	1 367	10 655	15 243	192	146	46	33 650	
36	284	4 887	4 530	357	5 171	8 750	88	77	11	30 812	388 606
37	166	4 184	3 632	502	4 300	6 613	78	58	20	39 841	
38	265	10 954	8 894	2 060	11 219	10 291	268	188	80	38 835	278 291
39	129	2 514	2 111	403	2 643	4 161	47	34	13	32 258	51 161

TABLE LXI

Labour Remuneration : Large-Scale Industries (Over 10 Employees) 1958-1962

Including Wages, Salaries and Working Proprietors' "Compensation"

O_{10}	Working Proprietors and non-paid Family Members	Paid Employees (given)	Wage-Earners (given)	Salary-Earners (given)	Total Employed (given)	Working Proprietor "Compensation" in Thou. Dr. (calculated)	Total Paid Employee Income in M. Dr. (given)	Wages in M. Dr. (given)	Salaries in M. Dr. (given)	Annual Salary per Salary-Earner (calculated)	Total O_{10} Remuneration (calculated)
	1	2	3	4	5	6	7	8	9	10	11
ISIC Code	1958										
20	1 710	22 779	18 469	4 310	24 489	53 164	414	280	134	31 090	
21	147	3 858	2 616	1 242	4 005	6 154	98	46	52	41 868	1 033 271
22	353	29 703	28 537	1 166	30 056	16 953	445	389	56	48 027	
23	1 038	44 748	40 374	4 374	45 786	43 191	778	596	182	41 610	821 191
24	949	10 912	10 004	908	11 861	18 813	158	140	18	19 828	176 813
25	503	3 906	3 618	288	4 409	10 479	56	50	6	20 833	143 423
26	331	4 373	4 140	233	4 704	9 944	67	60	7	30 043	
27	80	3 821	3 344	477	3 901	3 354	80	60	20	41 929	270 431
28	218	6 859	4 518	2 341	7 077	7 077	180	104	76	32 465	
29	139	2 776	2 473	303	2 915	5 046	54	43	11	36 304	
30	72	3 261	2 897	364	3 333	2 373	68	56	12	32 967	539 352
31	620	17 050	13 455	3 595	17 670	24 662	375	232	143	39 777	
32	8	384	266	118	392	271	10	6	4	33 898	
33	913	13 076	11 596	1 480	13 989	35 163	265	208	57	38 514	300 163
34	11	3 070	2 573	497	3 081	553	87	62	25	50 302	87 553
35	453	10 202	8 835	1 367	10 655	15 243	192	146	46	33 650	
36	284	4 887	4 530	357	5 171	8 750	88	77	11	30 812	388 606
37	166	4 184	3 632	502	4 300	6 613	78	58	20	39 841	
38	265	10 954	8 894	2 060	11 219	10 291	268	188	80	38 835	278 291
39	129	2 514	2 111	403	2 643	4 161	47	34	13	32 258	51 161

TABLE LXI
(Cont Inued)

0 10	1	2	3	4	5	6	7	8	9	10	11
ISIC Code	1959										
20	1 417	220033	17 506	4 527	23 450	46 013	420	273	147	32 472	
21	153	3 222	2 208	1 014	3 375	7 393	91	42	49	48 323	1 010 732
22	107	28 204	27 099	1 105	28 311	5 326	441	386	55	49 774	
23	992	38 007	34 278	3 729	36 999	42 032	681	523	158	42 371	723 032
24	835	9 645	9 181	464	10 480	17 996	157	147	10	21 552	174 996
25	594	4 349	4 037	312	4 943	32 929	70	63	7	22 436	175 167
26	228	3 973	3 784	189	4 201	7 238	65	59	6	31 746	
27	76	3 887	3 373	514	3 963	3 253	83	61	22	42 802	286 408
28	223	6 402	4 187	2 215	6 625	8 155	192	111	81	35 569	
29	112	2 754	2 431	323	2 866	4 161	61	49	12	37 152	
30	53	2 108	1 837	271	2 161	1 956	47	37	10	36 900	568 118
31	597	15 829	12 103	3 726	16 426	24 514	375	222	153	41 063	
32	10	1 513	1 000	513	1 523	487	54	29	25	48 733	
33	995	12 722	11 272	1 450	13 717	40 486	279	220	59	40 690	319 486
34	12	3 046	2 582	464	3 058	672	91	65	26	56 034	91 672
35	488	10 305	8 933	1 372	10 793	22 408	209	146	63	45 918	
36	238	4 346	3 795	551	4 584	8 207	87	68	19	34 483	418 310
37	183	4 085	3 538	547	4 268	7 695	84	61	23	42 048	
38	197	9 950	8 053	1 897	10 147	7 996	255	178	77	40 590	262 996
39	135	2 765	2 394	371	2 900	5 458	54	39	15	40 431	59 458

TABLE VII
(Continued)

0 10	1	2	3	4	5	6	7	8	9	10	11
ISIC Code	1960										
20	1 438	21 671	17 170	4 501	23 109	51 756	450	288	162	35 992	
21	121	3 389	2 114	1 275	3 510	6 263	110	44	66	51 765	1 030 561
22	129	23 780	22 735	1 045	23 909	6 542	406	353	53	50 718	
23	974	38 113	34 309	3 804	39 087	43 784	715	544	171	44 953	758 784
24	683	9 362	8 803	559	10 045	17 106	143	129	14	25 045	160 106
25	635	4 345	4 040	305	4 980	16 656	66	58	8	26 230	162 552
26	258	4 250	4 047	203	4 508	8 898	71	64	7	34 483	
27	60	3 884	3 361	523	3 944	2 868	90	65	25	47 801	312 765
28	202	6 632	4 330	2 302	6 834	7 897	212	122	90	39 096	
29	118	2 865	2 541	324	2 983	3 642	59	49	10	30 864	
30	56	2 354	2 079	275	2 410	2 240	54	43	11	40 000	585 844
31	604	15 028	11 234	3 794	15 632	25 631	396	235	161	42 435	
32	7	1 195	751	444	1 202	331	45	24	21	47 297	
33	920	13 498	11 972	1 526	14 418	39 187	303	238	65	42 595	342 187
34	12	3 373	2 861	512	3 385	703	110	80	30	58 594	110 703
35	483	10 499	9 016	1 483	10 982	19 867	224	163	61	41 133	
36	240	4 252	3 703	549	4 492	8 306	89	70	19	34 608	452 384
37	147	4 563	3 853	710	4 710	6 211	105	75	30	42 254	
38	215	11 875	10 375	1 500	12 090	9 890	337	268	69	46 000	346 890
39	135	2 756	2 383	373	2 891	5 429	56	41	15	40 214	61 429

TABLE 'J1
(Cont Inued)

0 10	1	2	3	4	5	6	7	8	9	10	11
ISIC Code	1960										
20	1 438	21 671	17 170	4 501	23 109	51 756	450	288	162	35 992	
21	121	3 389	2 114	1 275	3 510	6 263	110	44	66	51 765	1 030 561
22	129	23 780	22 735	1 045	23 909	6 542	406	353	53	50 718	
23	974	38 113	34 309	3 804	39 087	43 784	715	544	171	44 953	758 784
24	683	9 362	8 803	559	10 045	17 106	143	129	14	25 045	160 106
25	635	4 345	4 040	305	4 980	16 656	66	58	8	26 230	162 552
26	258	4 250	4 047	203	4 508	8 896	71	64	7	34 483	
27	60	3 884	3 361	523	3 944	2 868	90	65	25	47 801	312 765
28	202	6 632	4 330	2 302	6 834	7 897	212	122	90	39 096	
29	118	2 865	2 541	324	2 983	3 642	59	49	10	30 864	
30	56	2 354	2 079	275	2 410	2 240	54	43	11	40 000	585 844
31	604	15 028	11 234	3 794	15 632	25 631	396	235	161	42 435	
32	7	1 195	751	444	1 202	331	45	24	21	47 297	
33	920	13 498	11 972	1 526	14 418	39 187	303	238	65	42 595	342 187
34	12	3 373	2 861	512	3 385	703	110	80	30	58 594	110 703
35	483	10 499	9 016	1 483	10 982	19 867	224	163	61	41 133	
36	240	4 252	3 703	549	4 492	8 306	89	70	19	34 608	452 334
37	147	4 563	3 853	710	4 710	6 211	105	75	30	42 254	
38	215	11 875	10 375	1 500	12 090	9 890	337	268	69	46 000	346 890
39	135	2 756	2 383	373	2 891	5 429	56	41	15	40 214	61 429

TABLE LXI
(Continued)

O_{10}	1	2	3	4	5	6	7	8	9	10	11
ISIC Code	1961										
20	1 328	20 199	15 874	5 653	21 527	47 769		286	169	35 971	
21	112	3 370	2 096	1 386	3 482	5 051	929	50	62	45 106	988 776
22	140	22 288	21 180	1 248	22 428	6 956		302	60	49 686	
23	991	38 404	34 595	4 800	39 395	42 944	799	608	197	43 334	841 944
24	596	9 050	8 596	1 050	9 646	15 431	140	128	12	25 891	155 431
25	549	4 180	3 887	842	4 729	15 282	146	61	9	27 836	170 781
26	300	4 144	3 913	531	4 444	9 499		68	8	31 666	
27	73	4 150	3 560	663	4 223	3 284	326	73	28	44 987	337 539
28	210	7 029	4 602	2 637	7 239	8 255		129	96	39 312	
29	134	2 885	2 631	388	3 019	4 557		52	11	34 008	
30	51	2 343	2 055	339	2 394	2 080	579	46	11	40 790	613 871
31	624	15 720	12 177	4 167	16 344	27 892		235	171	44 700	
32	7	1 323	771	559	1 330	342		24	29	48 853	
33	773	12 489	10 816	2 446	13 262	32 846	336	254	82	42 492	368 846
34	11	3 598	3 041	568	3 609	610	125	90	35	55 460	125 610
35	422	9 794	8 644	1 572	10 216	17 458		161	51	41 370	
36	317	4 940	4 353	904	5 257	11 658	465	82	23	36 777	501 524
37	176	6 322	5 389	1 109	6 498	7 408		105	43	42 092	
38	199	14 015	12 363	1 851	14 214	9 563	411	326	85	48 056	420 563
39	138	2 634	2 269	503	2 772	5 264	58	41	17	38 149	63 264

TABLE LXI
(Continued)

0_{10}	1	2	3	4	5	6	7	8	9	10	11
ISIC Code	1962										
20	1 367	21 566				49 144				35 950	
21	128	4 113			43 048	4 921	936			38 448	996 049
22	123	14 431				5 984				48 654	
23	981	38 249			39 412	40 922	838			41 715	878 922
24	870	8 659			9 232	23 279	142			26 757	165 279
25	517	3 978			9 246	15 222	151			29 443	176 059
26	341	3 246				9 837				28 849	
27	100	4 775			11 753	4 217	353			42 174	367 534
28	261	5 807				10 317				39 528	
29	234	2 119				8 693				37 152	
30	137	2 095			19 943	5 696	574			41 580	588 389
31	381	14 761				17 894				46 966	
32	9	837				454				50 409	
33	832	11 223			13 049	35 268	348			42 390	383 268
34	9	4 631			3 875	471	136			52 326	136 471
35	501	10 615				20 845				41 607	
36	411	4 898			2 203	16 007	560			38 947	605 532
37	207	6 565				8 680				41 931	
38	264	15 262			15 692	13 229	466			50 112	479 229
39	141	3 122			3 111	5 088	72			36 085	77 088

TABLE LX1
(Continued)

0_{10}	1	2	3	4	5	6	7	8	9	10	11
ISIC Code	1963										
20	1 406	26 951	20 860	6 091	28 357	58 032	664 119	412 713	251 406	41 275	
21	144	3 930	2 489	1 441	4 774	7 636	157 356	60 938	76 418	53 031	1 181 417
22	107	14 865	13 858	1 007	14 972	6 312	307 962	248 553	59 409	58 996	
23	971	43 033	38 608	4 425	44 004	49 029	971 824	748 390	223 431	50 493	1 020 853
24	1 144	10 685	9 840	845	11 809	37 213	190 609	163 122	27 487	32 529	227 822
25	485	4 868	4 457	411	5 353	16 665	93 470	79 348	14 122	34 360	215 659
26	383	4 352	4 006	346	4 735	14 339	91 185	78 231	12 954	37 439	
27	128	5 251	4 519	732	5 379	6 957	136 160	96 375	39 785	54 351	423 747
28	313	7 112	4 770	2 342	7 425	14 038	266 592	161 554	105 038	44 850	
29	335	4 439	4 181	258	4 774	15 006	97 183	85 626	11 557	44 794	
30	224	5 505	4 730	775	5 729	11 533	139 469	99 567	39 902	51 436	687 318
31	138	9 929	6 776	3 153	10 067	7 828	347 254	168 386	178 868	56 729	
32	12	1 275	690	585	1 287	881	58 164	25 214	42 950	73 419	
33	892	15 767	13 639	2 128	16 659	47 841	457 416	343 282	114 134	53 634	505 257
34	7	2 908	2 379	529	2 915	501.	122 058	84 161	37 897	71 639	122 559
35	580	13 418	12 091	1 327	13 998	28 254	317 569	252 925	64 644	48 714	
36	505	6 547	5 862	685	7 052	22 792	157 036	126 120	30 916	45 133	752 384
37	238	8 030	6 352	1 678	8 268	11 614	215 319	133 438	81 881	48 797	
38	329	11 345	9 465	1 880	11 674	18 391	346 673	241 581	105 092	55 900	365 064
39	145	1 357	1 233	124	1 502	6 161	28 261	22 992	5 269	42 492	34 422

TABLE LXI
(Continued)

0 10	1	2	3	4	5	6	7	8	9	10	11
ISIC Code	1964										
20	1 521	28 086	21 503	6 583	29 607	69 578	766 927	465 786	301 141	45 745	
21	141	3 997	2 513	1 484	4 138	7 926	149 075	65 653	83 422	56 214	1 323 940
22	98	13 666	12 611	1 055	13 764	6 191	324 243	257 591	66 652	63 177	
23	964	43 921	39 324	4 597	44 885	51 856	1 081 720	834 434	247 286	53 793	1 133 576
24	1 107	11 181	10 273	908	12 288	40 626	223 174	189 851	33 323	36 699	263 800
25	489	4 806	4 353	453	5 295	18 128	103 264	86 471	16 793	37 071	234 143
26	342	4 334	3 856	478	4 676	13 675	99 076	79 962	19 114	39 987	
27	124	5 216	4 437	779	5 340	7 401	153 101	106 606	46 495	59 685	457 925
28	305	7 284	4 665	2 619	7 589	13 735	283 688	165 745	117 943	45 034	
29	312	4 016	3 772	244	4 328	15 966	98 917	86 431	12 486	51 172	
30	198	6 272	5 268	1 004	6 470	10 592	175 587	121 877	53 710	53 496	782 915
31	138	10 385	6 980	3 409	10 527	8 692	405 050	190 329	214 721	62 987	
32	12	1 095	539	556	1 107	984	67 127	21 544	45 583	81 984	
33	883	16 120	13 775	2 345	17 003	52 404	533 000	393 908	139 172	59 348	585 484
34	5	2 649	2 194	455	2 654	443	132 518	92 198	40 320	88 615	132 961
35	592	14 156	12 571	1 585	14 748	31 916	380 419	294 968	85 451	53 912	
36	478	6 942	6 197	745	7 420	23 700	181 358	144 420	36 938	49 581	900 746
37	244	9 327	7 273	2 045	7 571	12 496	270 857	165 664	105 193	51 214	
38	331	12 758	10 078	2 680	13 089	19 521	447 227	289 171	158 056	58 976	466 748
39	155	1 462	1 314	144	1 617	6 708	34 054	27 649	6 405	43 277	40 762

TABLE LXI
(Continued)

0 10	1	2	3	4	5	6	7	8	9	10	11
ISIC Code	1965										
20	1 618	28 662	21 845	6 817	30 280	81 083	863 453	521 835	341 618	50 113	
21	144	4 402	2 755	1 647	4 546	8 994	190 457	87 586	102 871	62 460	1 546 840
22	83	14 708	13 580	1 128	14 791	5 501	397 352	322 587	74 765	66 281	
23	996	44 352	39 637	4 715	45 348	56 029	1 204 571	939 334	265 237	56 254	1 260 600
24	1 118	11 747	10 736	1 011	12 865	43 572	260 902	221 500	39 402	38 973	304 474
25	497	5 467	5 021	446	5 964	22 358	129 008	109 944	20 064	44 987	295 168
26	358	4 471	3 931	540	4 829	14 696	112 115	89 947	22 168	41 052	
27	132	6 054	5 136	918	6 186	8 511	202 041	142 850	59 191	64 478	540 008
28	281	7 337	4 628	2 709	7 618	13 762	315 694	183 015	132 679	48 977	
29	345	3 967	3 692	275	4 312	19 847	110 903	95 083	15 820	57 527	
30	232	6 568	5 422	1 146	6 800	14 139	207 508	137 665	69 843	60 945	1 027 256
31	128	12 392	8 338	4 054	12 520	9 348	567 371	271 285	296 086	73 036	
32	11	1 332	555	777	1 343	1 035	97 105	23 964	73 141	94 133	
33	1 006	17 245	14 661	2 584	18 251	66 693	647 676	476 369	171 307	66 295	714 369
34	6	3 280	2 725	555	3 286	559	176 399	124 649	51 750	93 243	176 958
35	643	14 590	12 808	1 782	15 233	38 585	439 376	332 442	106 934	60 008	
36	522	7 351	6 491	860	7 873	27 292	218 339	173 376	44 963	52 283	1 059 979
37	264	9 679	7 369	2 310	9 943	15 193	321 194	188 256	132 938	57 549	
38	350	13 636	10 609	3 027	13 986	22 724	565 266	368 733	196 533	64 927	587 990
39	178	1 698	1 491	207	1 876	8 701	43 517	33 398	10 119	48 884	52 218

TABLE LXI
(Continued)

0 10	1	2	3	4	5	6	7	8	9	10	11
ISIC Code	1966										
20	1 537	30 644	23 259	7 385	32 181	86 307	1 039 527	624 840	414 687	56 153	
21	148	5 263	3 268	1 995	5 411	9 743	243 357	112 025	131 332	65 831	1 805 019
22	86	13 982	12 812	1 170	14 068	6 390	419 695	332 766	86 929	74 298	
23	997	45 376	40 318	5 058	46 373	64 256	1 436 528	1 110 547	325 981	64 449	1 500 784
24	1 194	12 205	11 122	1 083	13 399	54 655	303 663	254 089	49 574	45 775	358 318
25	504	5 671	5 190	481	6 175	27 470	153 732	127 515	26 217	54 505	328 367
26	372	4 568	3 973	595	4 940	16 968	130 107	102 967	27 140	45 613	
27	123	6 554	5 416	1 138	6 677	8 206	240 489	164 570	75 919	66 713	641 269
28	295	7 805	4 803	3 002	8 100	15 953	376 621	214 283	162 338	54 077	
29	355	3 760	3 480	280	4 115	21 779	121 666	104 488	17 178	61 350	
30	214	7 151	5 943	1 208	7 365	14 049	255 114	175 811	79 303	65 648	1 177 093
31	142	12 876	8 459	4 417	13 018	11 284	654 070	303 081	350 989	79 463	
32	8	1 378	423	955	1 386	648	98 483	21 059	77 424	81 072	
33	1 043	17 849	14 922	2 927	18 892	73 198	743 701	538 283	205 418	70 180	816 899
34	8	4 498	3 365	1 133	4 506	850	297 936	177 508	120 428	106 291	298 786
35	628	14 755	12 789	1 966	15 383	39 700	506 132	381 848	124 284	63 217	
36	521	7 648	6 651	997	8 169	29 566	257 942	201 363	56 579	56 749	1 224 518
37	245	9 490	7 132	2 358	9 735	16 316	374 862	217 828	157 034	66 596	
38	377	13 891	10 617	3 274	14 283	25 914	603 724	378 676	225 048	68 738	629 638
39	176	1 824	1 593	231	2 000	10 738	54 236	40 142	14 094	61 013	64 974

Note : For columns 3, 4, 8 and 9 in the Table for year 1962 see text, p. 189.
Column 11 throughout and some of the 1961 and 1962 columns given at the National Accounts level of aggregation.

TABLE LXII

Calculation of the Ratio of Employed Labour to Proprietors for all Industry ($O_{10} + U_{10}$) for the Years 1959-1962.

ISIC Code	1958 (calculated)	1959	1960	1961	1962	1963 (calculated)
20	.370372	.372215	.374058	.375901	.377744	.379586
21	.357145	.369581	.382017	.394453	.406889	.419324
22	.022989	.020139	.017289	.014439	.011589	.008738
23	.096151	.104425	.112699	.120973	.129247	.137520
24	.526316	.540639	.554962	.569285	.583608	.597929
25	.526316	.541990	.557664	.573338	.589012	.604685
26	.357145	.383664	.410183	.436702	.463221	.489740
27	.068962	.070315	.071668	.073021	.074374	.075727
28	.192311	.202594	.212877	.223160	.233443	.243726
29	.303029	.296672	.290315	.283958	.277601	.271246
30	.107525	.122515	.137505	.152495	.167485	.182475
31	.208335	.189610	.170885	.152160	.133435	.114708
32	.032049	.033899	.035749	.037599	.039449	.041299
33	.243902	.249992	.256082	.262172	.268262	.274353
34	.024999	.021018	.017037	.013056	.009075	.005092
35	.454544	.454580	.454616	.454652	.454688	.454726
36	.204081	.209970	.215859	.221748	.227637	.233526
37	.263156	.248233	.233310	.218387	.203464	.188543
38	.270270	.291768	.313266	.334764	.356262	.377761
39	.400001	.421847	.443693	.465539	.487385	.509230

Note : 1963 ratios calculated from data in National Statistical Service of Greece : Annual Industrial Survey for the Year 1963, L:16 Industry etc., Athens, 1967.
1958 ratios calculated from data in National Statistical Service of Greece : Census of Manufacturing, Artisan and Commercial Establishments of 1958, Athens 1960, Publ. Industry L:1, Table 12 and L:3, Tables III, p. 39 and Table I, p. 34. Labour/Entrepreneur ratios also reproduced in George Coutsoumaris : The Morphology of Greek Industry, Center of Economic Research, Athens, 1963, p.72-73, Table 2.18. for the year 1958.
1959 to 1962 ratios derived by interpolation.

TABLE LXIII

Labour Remuneration : Small-Scale Industries (Under 10 Employees) 1958-1962

Including Wages, Salaries and Working Proprietors' "Compensation"

	U_{10}	$0_{10} + U_{10}$ Employed (calculated)	0_{10} Employed (given)	U_{10} Employed (calculated)	0_{10} Annual Wages + Salaries per Paid Employee In Dr. (calculated)	1963 Wages + Salaries per Paid Employee $U_{10} / 0_{10}$ Differential	Total U_{10} Remuneration Including Proprietor "Compensation" In Thou. Dr.	Grand Total Labour Income Including all $0_{10} + U_{10}$ Remuneration In Thou. Dr.	Total $0_{10} + U_{10}$ Employers (calculated)	U_{10} Employers (calculated)
		1	2	3	4	5	6	7	8	9
ISIC Code		1958								
20		77 350	24 489	52 861	18 175	.8272	794 731		28 648	26 938
21		10 066	4 005	6 061	25 402	.4635	71 361	1 899 363	3 595	3 448
22		18 543	30 056	*	14 982	1.2430	*		426	(73)
23		53 346	45 786	7 560	17 386	.7435	97 724	918 915	5 129	4 091
24		67 261	11 861	55 400	14 479	.7190	576 736	753 549	35 400	34 451
25		23 051	4 409	18 642	14 337	.7674	205 103	503 459	12 132	11 629
26		21 838	4 704	17 134	15 321	.5902	154 933		7 799	7 468
27		4 665	3 901	764	20 937	.6897	11 032	318 385	321	241
28		9 763	7 077	2 686	26 243	.5238	36 922		1 877	1 659
29		2 957	2 915	42	19 452	.7126	582		896	757
30		1 765	3 333	*	20 852	.6115	*	554 957	190	(118)
31		18 723	17 670	1 053	21 994	.6487	15 023		3 900	3 280
32		381	392	*	26 042	.5627	*		12	(4)
33		22 421	13 989	8 432	20 266	.5601	95 711	395 874	5 468	4 555
34		1 910	3 081	*	28 339	1.1943	*	87 553	47	(36)
35		32 906	10 655	22 251	18 820	.5847	244 851		14 957	14 504
36		9 416	5 171	4 245	18 007	.6288	48 065	736 514	1 921	1 637
37		9 416	4 300	5 116	18 868	.5697	54 992		2 477	2 311
38		22 844	11 219	11 625	24 466	.4504	128 101	406 392	6 174	5 909
39		4 929	2 643	2 286	18 695	.5859	25 039	76 200	1 971	1 842

TABLE LXIII
(Continued)

U 10	1	2	3	4	5	6	7	8	9
ISIC Code C	1959								
20	79 185	23 450	55 735	19 062	.8272	878 834		29 473	28 056
21	10 305	3 375	930	28 243	.4635	90 718	1 980 284	3 808	3 655
22	18 982	28 311	*	15 636	1.2430			382	(275)
23	48 150	38 999	9 151	17 918	.7435	121 910	844 942	5 028	4 036
24	64 267	10 480	53 787	16 278	.7190	629 516	804 512	34 745	33 910
25	24 694	4 943	19 751	16 096	.7674	243 965	604 463	13 384	12 790
26	23 395	4 201	19 194	16 360	.5902	185 331		8 975	8 747
27	4 915	3 963	952	21 353	.6897	14 020	357 955	345	122
28	10 287	6 625	3 662	29 991	.5238	57 527		2 084	1 861
29	3 191	2 866	325	22 150	.7126	5 130		946	834
30	1 904	2 161	*	22 296	.6115		631 309	233	(180)
31	20 204	16 426	3 778	23 691	.6487	58 061		3 830	3 233
32	411	1 523	*	35 691	.5627			14	(4)
33	25 401	13 717	11 684	21 931	.5601	143 521	463 007	6 350	5 355
34	1 911	3 058	*	29 875	1.1943		91 672	40	(28)
35	33 407	10 793	22 614	20 281	.5847	268 163		15 186	14 698
36	9 560	4 584	4 976	20 018	.6288	62 634	811 101	2 007	1 769
37	9 560	4 268	5 292	20 563	.5697	61 994		2 373	2 190
38	20 486	10 147	10 339	25 628	.4504	119 341	382 337	5 977	5 780
39	5 964	2 900	3 064	19 530	.5859	35 060	94 518	2 515	2 380

TABLE LXIII
(Continued)

U_{10}	1	2	3	4	5	6	7	8	9
ISIC Code	1960								
20	75 452	23 109	52 343	20 765	.8272	899 085		28 223	26 785
21	9 819	3 510	6 309	32 458	.4635	94 914	2 024 560	3 751	3 639
22	18 088	23 909	*	17 073	1.2430	*		312	(183)
23	48 805	39 087	9 718	18 760	.7435	135 547	894 331	5 500	4 817
24	63 676	10 045	53 631	15 275	.7190	589 014	749 120	35 337	34 654
25	26 130	4 980	21 150	15 190	.7674	246 541	608 726	14 571	13 936
26	24 755	4 508	20 247	16 706	.5902	199 633		10 154	9 896
27	5 238	3 944	1 294	23 172	.6897	20 680	402 580	375	315
28	10 963	6 834	4 129	31 966	.5238	69 135		2 333	2 131
29	3 359	2 983	376	20 593	.7126	5 517		975	857
30	2 004	2 410	*	22 940	.6115	*	687 616	275	(219)
31	21 263	15 632	5 631	26 351	.6487	96 255		3 633	3 029
32	433	1 202	*	37 657	.5627	*		15	(8)
33	29 256	14 418	14 838	22 448	.5601	186 560	528 747	7 492	6 572
34	2 033	3 385	*	32 612	1.1943	*	110 703	34	(22)
35	33 978	10 982	22 996	21 335	.5847	286 865		15 447	14 964
36	9 723	4 492	5 231	20 931	.6288	68 847	873 813	2 098	1 858
37	9 723	4 710	5 013	23 011	.5697	65 717		2 268	2 121
38	23 128	12 090	11 038	28 379	.4504	141 086	487 976	7 245	7 030
39	6 177	2 891	3 286	20 319	.5859	39 119	100 548	2 740	2 605

TABLE LX111
(Continued)

U_{10}	1	2	3	4	5	6	7	8	9
ISIC Code	1961								
20	76 401	21 527	54 874					28 719	27 391
21	10 670	3 482	7 188	20 259	.8254	1 057 767	2 026 563	4 208	4 096
22	14 092	22 428	*					203	63
23	49 500	39 395	10 105	20 805	.7436	156 330	998 274	5 988	4 997
24	63 009	9 646	53 363	15 470	.7199	594 296	749 727	35 870	35 274
25	28 210	4 729	23 481	17 540	.6749	483 501	654 282	16 173	15 624
26	21 807	4 444	17 363					9 523	9 223
27	5 781	4 223	1 558	29 162	.5933	109 434	446 975	422	349
28	12 006	7 239	4 767					2 679	2 469
29	9 157	3 019	6 138					2 600	2 466
30	7 635	2 394	5 241	25 998	.5757	172 705	786 576	1 164	1 113
31	12 138	16 344	*					.1 847	1 223
32	1 490	1 330	160					56	49
33	29 190	13 262	15 928	26 904	.5601	240 018	608 864	7 652	6 879
34	2 085	3 609	*	34 742	1.1943	*	125 610	27	(16)
35	34 499	10 216	24 283					15 685	15 263
36	11 442	5 257	6 185	22 084	.5833	453 960	955 484	2 537	2 220
37	11 271	6 498	4 773					2 461	2 285
38	25 664	14 214	11 450	29 326	.4504	151 236	571 799	8 591	8 392
39	6 062	2 772	3 290	22 020	.5859	42 446	105 710	2 822	2 684

TABLE LXIII
(Continued)

U_{10}	1	2	3	4	5	6	7	8	9
ISIC Code	1962								
20	73 840							27 892	26 525
21	10 312	43 048	54 724	23 336	.8254	1 054 068	2 050 117	4 195	4 067
22	13 620							157	34
23	51 002	39 412	11 590	21 909	.7436	188 819	1 067 741	6 591	5 610
24	63 733	9 232	54 501	16 399	.7199	643 419	808 698	37 195	36 325
25	29 589	9 246	43 217	20 903	.6749	609 681	785 740	17 428	16 911
26	22 874							10 595	10 254
27	6 227	11 753	7 409	33 359	.5933	146 638	514 172	463	363
28	12 935							3 019	2 758
29	8 751							2 429	2 195
30	7 297	19 943	9 129	28 972	.5757	152 264	740 653	1 222	1 085
31	11 600							1 547	1 166
32	1 424							56	47
33	31 748	13 049	18 699	31 008	.5601	324 756	708 024	8 516	7 684
34	2 199	3 875	*	29 367	1.1943	*	136 471	20	11
35	38 167							17 354	16 853
36	12 659	24 203	39 092	25 365	.5833	578 382	1 183 914	2 881	2 470
37	12 469							2 537	2 330
38	27 230	15 602	11 628	30 535	.4504	159 909	639 138	9 701	9 437
39	7 066	3 111	3 955	23 062	.5859	53 440	130 528	3 443	3 302

Note 1 For entries in parenthesis see text, p. 181.

TABLE LXIV

Labour Remuneration : Small-Scale Industries (Under 10 Employees) 1963-1966

Including Wages, Salaries and Working Proprietors' "Compensation"

U_{10}	Total U_{10} Personnel Employed (given)	Total U_{10} Proprietors (given)	Total U_{10} Paid Employees (given)	Annual U_{10} Wages + Salaries per Paid U_{10} Employee: Year 1963. In Dr.	Total U_{10} Remuneration Including Proprietors In Thou. Dr.	U_{10} Paid-Employee Remuneration In Thou. Dr. (given)	U_{10} Proprietor Remuneration In Thou. Dr. (calculated)	Total O_{10} + U_{10} Labour Remuneration Including Proprietors In Thou. Dr.
	1	2	3	4	5	6	7	8
ISIC Code	1963							
20	54 470	30 034	24 436	20 385	1 110 369	498 127	612 243	
21	7 497	4 708	2 789	16 201	121 457	45 184	76 274	2 422 591
22	363	27	336	25 753	9 348	8 659	695	
23	11 755	6 697	5 058	16 792	197 395	84 936	112 456	1 218 248
24	58 181	40 717	17 464	12 827	746 298	224 014	522 277	974 120
25	20 472	15 131	5 341	14 735	301 648	78 698	222 955	705 243
26	15 196	9 378	5 818	12 367	187 936	71 954	115 978	
27	986	354	632	17 886	17 636	11 304	6 332	558 458
28	5 963	2 950	3 013	19 634	117 075	59 156	57 920	
29	4 675	2 228	2 447	15 601	72 933	38 175	34 759	
30	2 157	1 215	942	15 493	33 417	14 594	18 824	854 810
31	2 443	1 297	1 146	22 698	55 426	26 000	29 426	
32	190	49	141	30 085	5 716	4 242	1 474	
33	15 832	8 022	7 810	16 251	257 283	126 919	130 365	762 540
34	31	8	23	50 130	1 554	1 153	401	124 113
35	24 733	17 032	7 701	13 838	342 247	106 564	235 689	
36	5 756	2 486	3 270	15 083	86 820	49 323	37 496	1 249 031
37	4 440	2 158	2 282	15 176	67 330	34 631	32 750	
38	14 271	9 472	4 799	13 764	196 431	66 055	130 373	561 495
39	6 732	4 048	2 684	12 203	82 151	32 753	49 398	116 573

TABLE LXIV

Labour Remuneration : Small-Scale Industries (Under 10 Employees) 1963-1966

Including Wages, Salaries and Working Proprietors' "Compensation"

U_{10} ISIC Code	Total U_{10} Personnel Employed (given)	Total U_{10} Proprietors (given)	Total U_{10} Paid Employees (given)	Annual U_{10} Wages + Salaries per Paid U_{10} Employee: Year 1963. In Dr.	Total U_{10} Remuneration Including Proprietors In Thou. Dr.	U_{10} Paid-Employee Remuneration In Thou. Dr. (given)	U_{10} Proprietor Remuneration In Thou. Dr. (calculated)	Total 0_{10} + U_{10} Labour Remuneration Including Proprietors In Thou. Dr.
	1	2	3	4	5	6	7	8
	1963							
20	54 470	30 034	24 436	20 385	1 110 369	498 127	612 243	
21	7 497	4 708	2 789	16 201	121 457	45 184	76 274	2 422 591
22	363	27	336	25 753	9 348	8 659	695	
23	11 755	6 697	5 058	16 792	197 395	84 936	112 456	1 218 248
24	58 181	40 717	17 464	12 827	746 298	224 014	522 277	974 120
25	20 472	15 131	5 341	14 735	301 648	78 698	222 955	705 243
26	15 196	9 378	5 818	12 367	187 936	71 954	115 978	
27	986	354	632	17 886	17 636	11 304	6 332	558 458
28	5 963	2 950	3 013	19 634	117 075	59 156	57 920	
29	4 675	2 228	2 447	15 601	72 933	38 175	34 759	
30	2 157	1 215	942	15 493	33 417	14 594	18 824	854 810
31	2 443	1 297	1 146	22 698	55 426	26 000	29 426	
32	190	49	141	30 085	5 716	4 242	1 474	
33	15 832	8 022	7 810	16 251	257 283	126 919	130 365	762 540
34	31	8	23	50 130	1 554	1 153	401	124 113
35	24 733	17 032	7 701	13 838	342 247	106 564	235 689	
36	5 756	2 486	3 270	15 083	86 820	49 323	37 496	1 249 031
37	4 440	2 158	2 282	15 176	67 330	34 631	32 750	
38	14 271	9 472	4 799	13 764	196 431	66 055	130 373	561 495
39	6 732	4 048	2 684	12 203	82 151	32 753	49 398	116 573

TABLE LXIV
(Continued)

U_{10}	1	2	3	4	5	6	7	8
ISIC Code	1964							
20	57 460	33 344	24 116	22 407	1 287 508	540 368	747 139	
21	8 319	5 317	3 002	17 584	146 278	52 786	93 494	2 777 784
22	930	93	837	21 568	20 058	18 052	2 006	
23	12 422	6 540	5 882	17 883	222 141	105 187	116 955	1 355 717
24	66 620	44 734	21 886	9 894	659 150	216 544	442 598	922 950
25	21 550	15 754	5 796	20 022	431 483	116 050	315 426	900 419
26	15 440	9 034	6 406	15 207	234 793	97 415	137 380	
27	1 245	386	859	21 846	27 199	18 766	8 432	610 999
28	5 902	2 852	3 050	21 328	125 875	65 049	60 827	
29	5 302	2 456	2 846	16 553	87 762	47 109	40 654	
30	1 877	1 075	802	21 022	39 459	16 860	22 599	979 637
31	2 536	1 272	1 264	24 903	63 153	31 477	31 676	
32	192	47	145	33 062	6 348	4 794	1 553	
33	16 828	7 781	9 047	17 253	290 335	156 089	134 245	875 819
34	41	14	27	56 074	2 299	1 514	785	133 260
35	25 506	17 733	7 773	16 040	409 326	124 743	284 579	
36	6 127	2 645	3 482	17 5[illegible]	107 650	61 178	46 472	1 507 258
37	5 161	2 263	2 898	17 349	89 536	50 276	39 260	
38	13 176	9 328	3 848	13 445	177 170	51 742	125 424	643 918
39	6 512	4 017	2 495	14 428	93 955	35 998	57 957	134 717

TABLE LXIV
(Continued)

U_{10}	1	2	3	4	5	6	7	8
ISIC Code	1965							
20	54 422	31 574	22 848	26 646	1 450 131	608 809	841 320	
21	7 161	4 688	2 473	22 016	157 654	54 445	103 211	3 172 361
22	634	46	588	27 974	17 736	16 449	1 286	
23	12 531	6 058	6 476	20 197	471 637	130 797	122 353	1 732 237
24	62 463	44 148	18 315	13 572	847 733	248 567	599 176	1 152 207
25	21 371	15 203	6 168	22 554	481 991	139 110	342 888	1 034 556
26	15 765	8 966	6 799	17 405	274 388	118 336	156 053	
27	1 297	370	927	24 947	32 356	23 126	9 230	705 465
28	5 950	2 866	3 084	22 370	133 101	68 989	64 112	
29	4 990	2 396	2 594	18 178	90 710	47 155	43 554	
30	2 069	1 034	1 035	23 498	48 616	24 320	24 296	1 247 046
31	2 704	1 433	1 274	27 630	74 793	35 200	39 593	
32	186	45	141	30 489	5 671	4 299	1 372	
33	16 497	7 859	8 638	19 482	321 401	168 289	153 109	1 035 770
34	44	12	32	63 563	2 797	2 034	762	179 755
35	24 861	16 723	8 138	17 531	435 846	142 670	293 170	
36	6 492	2 260	4 232	18 657	121 119	78 955	42 164	1 724 333
37	5 447	2 239	3 208	19 715	107 389	63 247	44 141	
38	12 976	3 089	3 887	18 630	241 737	72 413	169 328	829 727
39	6 651	4 024	2 627	15 034	99 990	39 494	60 496	152 208

TABLE LXIV
(Continued)

U_{10}	1	2	3	4	5	6	7	8
ISIC Code	1966							
20	54 966	31 145	23 821	30 865	1 696 532	735 238	961 290	
21	7 245	4 775	2 470	25 167	182 336	62 163	120 172	3 698 671
22	566	26	540	26 120	14 784	14 105	679	
23	12 566	5 890	6 676	23 684	297 610	158 113	139 498	1 798 394
24	59 013	44 078	14 935	15 314	903 707	228 710	675 010	1 262 025
25	19 820	14 681	5 139	23 935	474 395	123 003	351 399	1 105 338
26	17 005	9 009	7 996	17 799	302 666	142 318	160 351	
27	1 336	356	980	27 300	36 473	26 754	9 718	818 330
28	5 588	2 787	2 801	25 159	140 588	70 470	70 118	
29	5 218	2 595	2 623	21 530	112 345	56 474	55 870	
30	2 023	943	1 080	26 506	53 621	28 626	24 995	1 420 984
31	2 548	1 262	1 286	27 578	70 268	35 465	34 803	
32	213	60	153	35 948	7 657	5 500	2 156	
33	16 164	7 172	8 992	24 044	388 646	216 203	176 443	1 205 545
34	36	9	27	76 037	2 737	2 053	684	301 523
35	24 092	16 659	7 433	19 346	466 084	143 799	322 285	
36	6 713	2 456	4 257	24 201	162 460	103 023	59 437	1 980 495
37	5 496	2 482	3 014	23 186	127 433	69 884	57 547	
38	12 416	8 653	3 763	19 188	238 240	72 205	166 035	867 878
39	6 668	4 180	2 488	18 191	121 294	45 258	76 038	186 268

b. Total Labour Remuneration

The statistical problems in calculating the share of labour income again centre on the question of unavailability of data and of the inconsistency of some of the original sources. There exists reliable National Statistical Service information on large-scale firms (over 10 employees) covering the entire period 1958-1966. A lengthy process was nevertheless required for the estimate of income accruing to non-working proprietors and non-paid family members over that period. The National Accounts and the National Statistical Service annual Surveys do not give an estimate as it is thought to be credited to the profits account. But clearly some part of those "profits" are earned income which has to be calculated as such and subtracted from the profit estimates. In our case the profit estimates are derived from a different source (Federation of Greek Industries) and their accounting process excludes proprietor earned income from profits, so that as such earned income is given in another column (including marketing and general administration expenses) there is no need to adjust the F.G.I.-derived profit estimates downwards to take account of such income-component in profits. But this component nevertheless has clearly to be calculated and be added to the labour remuneration total, particularly as the non-paid proprietor component is taken into account in the total labour input measure. The problem has risen in a number of studies and the practical solutions vary, but one way is to assume that the unpaid family members and proprietors are given approximately the average for production workers' equivalent salary.(1) This method I adopt for the large-scale industry, although I modify it slightly for the small-scale industry estimations. Therefore I estimate the annual salary per salary-earner in $^{O}10$ industries (Table LXI , column 10) and then

(1) Vidar Ringstad: Estimating Production Functions and Technical Change from Micro Data. Samfunnsøkonomiske Studier Nr. 21, Statistisk Sentralbyra, Oslo, 1971, p. 30.

multiply the number of working proprietors etc. (Table LXI, column 1) by this annual salary per head and obtain the working proprietor compensation (Table LXI, column 6) for the industry.

One difficulty arises from the data for the years 1961 and 1962 in that the slightly altered census methodology from 1963 onwards and some altered definitions seem to disturb marginally the continuity of the data. In the end I selected the salary estimates for those two years not from the annual survey, but from the N.S.S.G.: Results of the Employment and Pay-Roll Survey in Industry and Handicraft - Data for the Years 1962 and 1963. Athens, 1965. The calculation of total salary remuneration was made from weekly estimates by multiplying the latter (total average weekly remuneration) by 58, that is the sum of 52 real weeks of the year plus 6 weeks covered by holiday bonuses according to the standard N.S.S.G. methodology.(1) I note that the above source is different in other respects from the annual Surveys for 1961 and 1962, as the industrial Survey covers a group of establishments which is larger, because it includes establishments with less than ten persons employed, as the criterion of employment is the number of all employed (including unpaid owners and family members) when the Employment and Payroll Survey only covers establishments with ten paid employees at least. So in Table LXI for 1961 and 1962 we obtain column 10 from the Employment and Payroll Survey and from this derive the employer income (column 6). But the total paid employee income in column 7 I obtain from the annual Industrial Survey, and some of the other columns (3, 4, 8 and 9 in 1962) I leave unfilled to avoid confusion and conflicting data.

The calculation of small-scale industry (under 10 employees) labour remuneration for the period 1963-1966 is given for paid employees in the annual Survey of Industry. The U_{10} proprietor income

(1) National Statistical Service: Results of the Employment and Pay-Roll Survey in Industry and Handicraft. Data for the Years 1962 and 1963, L:13, Industry and Handicraft, Athens, 1965, p. 25-26.

was then calculated by obtaining the annual wages + salaries per paid $^{U}10$ employee and multiplying it by the total $^{U}10$ proprietors (see Table LXIII). Total $^{U}10$ labour income is then derived and added to total $^{O}10$ to give the grand total labour remuneration on column 8. The reason for granting small-scale owners and their unpaid family members a smaller income than the corresponding large-scale one (equal to wages+salaries per $^{U}10$ paid employee, as compared with annual wages per $^{O}10$ wage earner in large-scale owners) is that the very large number of $^{U}10$ family members in small-scale establishments can obviously be expected to receive less than the proprietor of a large industrial unit for their services.

The $^{U}10$ 1958-1962 labour income requires a different method of calculation, as the available information refers to $^{O}10$ industries only. Two problems arise: the calculation of $^{U}10$ wages+ salaries per paid employee and the calculation of $^{U}10$ employers. Obtaining from the year 1963 the proportion of $^{U}10/^{O}10$ total income (including wages+salaries) we apply it on the known $^{O}10$ total income (including wages+salaries) for each of the years 1958 to 1962. This method assumes a constant ratio between the two, but no other clue is available for the construction of an even more accurate measure. The second problem is to calculate the number of $^{U}10$ employers for each of the years 1958-1962. From known ratios of employed labour to proprietors for the years 1958 and 1963 (ratios based on Census and Survey material) we interpolate and obtain the straight-line estimates for the intermediate years as given in Table LXII From the so calculated number of $^{O}10+^{U}10$ employers (given in Table LXIII column 8 for each of the years 1958 to 1962) we subtract the known number of $^{O}10$ employers (from Table LXI column 1) to arrive at the estimate of $^{U}10$ employers in Table LXIII, column 9. We note that in some cases we obtain estimates for $^{U}10$ employers where there is no $^{U}10$ employment in terms of paid employees. In those cases, as in the cases in Table LXI , column 3 where the given estimate of $^{O}10$ employed (in column 2) exceeds our own estimate of total $^{U}10 + ^{O}10$ employed we constructed in the light of subsequent infor-

TABLE LXV

A. Total Labour Remuneration : 1958-1966

In Thousand Drachmas, at Current Prices

	20-22	23	24	25-26	27-28	29-32
1958	1 899 363	918 915	753 549	503 459	318 385	554 957
1959	1 980 284	844 942	804 512	604 463	357 955	631 309
1960	2 024 560	894 331	749 120	608 726	402 580	687 616
1961	2 026 563	998 274	749 727	654 282	446 973	786 576
1962	2 050 117	1 067 741	808 698	785 740	514 172	740 653
1963	2 422 591	1 218 248	974 120	705 243	558 458	854 810
1964	2 777 784	1 355 717	922 950	900 419	610 999	979 637
1965	3 172 361	1 732 237	1 152 207	1 034 856	705 465	1 247 046
1966	3 698 671	1 798 394	1 262 025	1 105 338	818 330	1 420 984

	33	34	35-37	38	39
1958	395 874	87 553	736 514	406 392	76 200
1959	463 007	91 672	811 101	382 337	94 518
1960	528 747	110 703	873 813	487 976	100 548
1961	607 864	125 610	955 484	571 799	105 710
1962	708 024	136 471	1 183 914	639 138	130 528
1963	762 540	124 113	1 249 031	561 495	116 573
1964	875 819	135 260	1 507 258	643 918	134 717
1965	1 035 770	179 755	1 724 333	829 727	152 207
1966	1 205 545	301 523	1 980 495	867 878	186 268

B. Total Labour Remuneration : 1958-1966

In Thousand Drachmas, at Constant 1958 Prices

	20-22	23	24	25-26	27-28	29-32
1958	1 899 363	918 915	753 549	503 459	318 385	554 957
1959	1 920 355	832 483	739 209	608 104	336 005	629 294
1960	1 864 881	893 984	696 785	610 039	362 544	796 055
1961	1 877 759	965 738	700 943	658 904	439 585	861 933
1962	1 857 751	1 046 790	775 320	769 539	488 650	771 797
1963	2 175 146	1 207 576	900 565	715 986	486 793	927 498
1964	2 532 248	1 313 301	822 321	884 195	528 820	1 064 755
1965	2 828 966	1 647 382	1 031 309	947 129	597 693	1 357 966
1966	3 227 971	1 643 257	1 075 355	972 853	690 210	1 487 709

	33	34	35-37	38	39
1958	395 874	87 553	736 514	406 392	76 200
1959	491 102	88 116	835 144	377 071	85 762
1960	574 348	129 955	903 349	418 265	86 024
1961	663 822	142 138	1 002 475	465 733	95 050
1962	738 939	158 795	1 241 030	475 771	116 351
1963	785 138	162 969	1 300 901	415 586	105 663
1964	862 151	166 870	1 538 797	466 102	121 040
1965	996 674	221 937	1 737 059	591 172	131 945
1966	1 092 649	381 061	1 923 249	594 845	143 283

Note : Use is made of National Income deflators computed from Ministry of Coordination National Accounts of Greece data for the conversion to constant prices.

mation which the Statistical Service ought to have used to revise the $^{0}/_{10}$ employment estimates, we assume that the entries in question (indicated by * in column 3 or placed in parenthesis in column 9) equal zero and proceed to calculated the labour income on the basis of the remaining entries alone.

The total of small-scale and large-scale-industry labour remuneration is given in Table LXV and converted to constant prices, is used for the calculation of factor shares in the following paragraph. National Accounts deflators were used for the conversion to constant prices.

c. The Distribution of Income.

Income distribution theories in the context of marginal productivity analysis have been closely associated with the theory of production and factor shares are generally explained in terms of impersonal laws governing the productive processes.(1) The socio-economic rationale of the theory was developed in turn by Walras, Pareto, Böhm-Bawerk, Wicksell, J.B.Clark and Marshall. The early economic ethic seemed unshakable : "The welfare of the laboring classes depends on whether they get much or little; but their attitude toward other classes - and, therefore, the stability of the social state - depends chiefly on the question, whether the amount they get, be it large or small, is what they produce. If they create a small amount of wealth and get the whole of it, they may not seek to revolutionise society; but if it were to appear that they produce an ample amount and get only part of it, many of them would become revolutionists ... The right of society to exist ... (is) at stake. These facts lend to this problem of distribution its measureless importance".(2)

The economic ethic is still there today in a rather more elaborate framework. What income distribution would involve in modern times, nevertheless, is a qualified marginal productivity theory : a combination of marginal productivity theory with other analytical elements.(3) An awareness of the inadequacies of the old established doctrines often surfaces in contemporary economic thought. The very fact that the distribution of income is not, in the short run, a well-founded economic concept(4) reflects on the entire process of adaptation of our thought and on the inherent difficulties of relating

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(1) Tibor Scitovsky: "A Survey of Some Theories of Income Distribution", The Behaviour of Income Shares : Studies in Income and Wealth, Vol. 27, NBER, Princeton, 1964, p. 22.

(2) John Bates Clark: The Distribution of Wealth, Macmillan, New York, 1927, First Edition: 1889, pp. 3-4, 6-9, 323-24.

(3) William J. Fellner: "Significance and Limitations of Contemporary Distribution Theory", A.E.R., Papers and Proceedings, Vol.43, 1953, p.484. Some of these elements are outlined in pp. 195-97 below.

(4) John Hicks: Capital and Time. A Neo-Austrian Theory, Clarendon Press, Oxford, 1973, p. 184.

TABLE LXVI

Factor Shares in Income Distribution

Under the Constraint a + b = 1

	20-22 Food Drink Tobacco		23 Textiles		24 Clothing Footwear		25-26 Wood Cork Furniture		27-28 Paper Printing		29-32 Leather-Rubber Plastics Chemicals-Petrol	
	Capital Share a	Labour Share b	Capital Share a	Labour Share b	Capital Share a	Labour Share b	Capital Share a	Labour Share b	Capital Share a	Labour Share b	Capital Share a	Labour Share b
1958	.165153	.834847	.263947	.736053	.000000	.999999	.075820	.924180	.275378	.724622	.384106	.615894
1959	.166291	.833709	.278827	.721173	.006751	.993249	.078820	.921180	.299746	.700254	.489653	.510347
1960	.194535	.805465	.361486	.638514	.014012	.985988	.311519	.688481	.322527	.677473	.367710	.632290
1961	.200491	.799509	.347765	.652235	.182980	.817020	.272836	.727164	.233059	.766941	.282385	.717615
1962	.170739	.829261	.394261	.605739	.118541	.881459	.139120	.860880	.120871	.879129	.298126	.701874
1963	.140827	.859173	.352294	.647706	.154855	.845145	.078493	.921507	.200131	.799869	.227305	.772695
1964	.114532	.885468	.280996	.719004	.157474	.842526	.070280	.929720	.122200	.877800	.185864	.814136
1965	.168717	.831283	.265899	.734101	.106482	.893518	.080846	.919154	.136954	.863046	.115947	.884053
1966	.185825	.814175	.293069	.706931	.173689	.826311	.094958	.905042	.137207	.862793	.128648	.871352

	33 Non-metallic Minerals		34 Basic Metal Industries		35-37 Metal Products Machinery Electr.Equipm.		38 Transport Equipment		39 Miscellaneous Industries	
	Capital Share a	Labour Share b	Capital Share a	Labour Share b	Capital Share a	Labour Share b	Capital Share a	Labour Share b	Capital Share a	Labour Share b
1958	.297195	.702805			.169994	.830006				
1959	.217180	.782820			.218073	.781927				
1960	.195402	.804598			.212218	.787782				
1961	.162950	.837050			.186023	.813977				
1962	.171952	.828048	.196369	.803631	.152725	.847275	.275652	.724348	.506879	.493121
1963	.163197	.836803	.281074	.718926	.292541	.707459	.332245	.667755	.668959	.331041
1964	.172963	.827037	.169801	.830199	.267031	.732969	.328935	.671065	.517086	.482914
1965	.183016	.816984	.159689	.840311	.246579	.753421	.324922	.675078	.462068	.537932
1966	.206955	.793045	.085803	.914197	.245627	.754373	.359233	.640767	.328202	.671798

Note : Capital Share in Branch 24, Year 1961 Adjusted Downwards.

- Data for branches 34, 38 and 39 unavailable before 1962.

the process of growth to saving and investment in the context of the static concept of a production function depending on marginality conditions.(1) The implications of such conditions are seen on p.195ff.

The factor shares on Table LXVI are derived from my estimates of profits and of labour remuneration earlier in this chapter. The variations in income distribution are quite considerable in some branches but this is not inconsistent with earlier empirical investigations on the same subject in other countries.(2) On the other hand international comparisons as to the actual level of factor shares are generally difficult to substantiate and explain properly mainly because of differences in factor costs (including fuels and raw materials) from one country to another, but also because of the very structure of production. Differences from elements outside the domain of the marginal productivity theory such as the effect of collective bargaining, unionisation, strikes and negotiating skills, are discussed in the context of a production function on p.196 and discourage direct comparisons. Significantly and despite such differences, the capital factor share in the U.K. manufacturing industry computed at constant 1958 prices after stock appreciation for the years 1958 to 1962 is not far from the Greek average.

Estimate of Gross Profit to Total Factor Income Ratio in the Manufacturing Industry, United Kingdom, 1958-62

1958	0.308
1959	0.308
1960	0.310
1961	0.286
1962	0.278

Source : P.E. Hart: "A Long Run Analysis of the Rate of Return on Capital in Manufacturing Industry, United Kingdom, 1920-62", Chapter 18, P.E. Hart, Ed., Studies in Profit, Business Saving and Investment in the United Kingdom, 1920-1962, Vol. II, London, Allen and Unwin, 1968, p. 234.

(1) M. Bronfenbrenner: "Neo-Classical Macro-Distribution Theory", J. Marchal and B. Ducros, Eds., The Distribution of National Income, IEA, Macmillan, London, 1968, p. 476 ff.

(2) E.H. Phelps Brown and P.E. Hart: "The Share of Wages in National Income", Economic Journal, 62, 1952, p. 253 ff.
E.T. Nevin: "The Cost Structure of British Manufacturing", Economic Journal, 123, 1963, p. 642 ff.

"Gross" profits are calculated before taxes (whether company profit or non-corporate profit taxes) in both the U.K. and Greece. In the latter case they are calculated net of depreciation. Variation in the income shares can be expected to be larger in the case of individual industries than on the aggregate total industry level. Branch 24 actually records a loss in the year 1958 and the factor shares are adjusted to zero profits level. It is unfortunate that no earlier recorded statistical evidence exists for the calculation of income shares before 1962 in branches 34, 38 and 39.

CHAPTER TEN

Total Factor Input, Productivity and Technical Change

A. Properties of the Aggregate Production Function

Technological change has often been presented as an important factor responsible for growth of productivity in the economy. The precise effect of the rate of this change on the rate of economic growth, nevertheless, although substantial is not easy to define, much less to measure, given the complexity of factors whose interaction has affected the recovery of the Greek manufacturing industry. Additionally most of the papers concerned with empirical results have tried to explain the growth in the context of developed economies . It is therefore of considerable interest to inquire to what extent the theory of growth applies to features of economic life, as experienced in managing individual sectors of the Greek manufacturing industry in their development, and particularly so when the traditional factor inputs comprise an exogenously determined volume of foreign finance. The enormous statistical difficulties in obtaining reliable information for this task have to some degree conditioned the extent and nature of this inquiry, but enough of interest can be said in the end to justify this extensive statistical undertaking.

There are always explicit or tacit assumptions in the simplified models economists use, and those very properties sometimes limit their applicability and cause controversies. The statistical deficiencies in documenting the elements of Greek economic growth are therefore not the only problems in a research of this kind. Some of the "stylised facts" implicitly accepted by the theory of growth (1) have to be reconsidered when applied to a developing economy.

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(1) William D. Nordhaus : Invention, Growth and Welfare : A Theoretical Treatment of Technological Change, The M.I.T. Press, Cambridge, Mass., 1969, p. 8-15.

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(1) William D. Nordhaus : Invention, Growth and Welfare : A Theoretical Treatment of Technological Change, The M.I.T. Press, Cambridge, Mass., 1969, p. 8-15.

Technological change requires more than a simple alteration in the method of production which is utilised. A general advancement of knowledge affecting persons and organisations as well as equipment in its diffusion is required and the limitations of such knowledge sets limits on the output produced with the given limited amounts of inputs. The production function defines the maximum output rate feasible under the constraints of given inputs with a given level of technology.(1) A change in technology brings about a change in the production function, and this move in the technological frontier is measurable and gives us an index of technological change.

The hypothesis that a substantial rate of growth in the volume of capacity-output in the manufacturing industry can be ascribed to technical progress can be tested on the basis of a production-function-type relationship between the capital and labour inputs and the output produced over a relatively long period of time. Throughout this time-period the trend of actual volume of production is assumed to represent the volume of full capacity output.

A production function approach for the measurement and evaluation of technical progress as a source of capacity growth, is justified, because of its property of allowing substitution between the capital and labour factor-inputs (if the production function is restricted to two inputs only), in accordance with the general features of a production process in the long run.(2) Where in the short run a smooth product isoquant is meaningless since the installed capacity equipment has fixed labour requirements, the long-run substitutability in a production

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(1) Edwin Mansfield : The Economics of Technological Change, W.W. Norton, New York, 1968, Chapter I.
John W. Kendrick : "The Gains and Losses from Technological Change", 'Technological Change and Economic Progress', Journal of Farm Economics, 46, 1964, p. 1065 ff.

(2) Robert M. Solow : Capital Theory and the Rate of Return, North Holland Publishing Co., Amsterdam, 1963, p. 30.

function can indicate changes in the technology employed.(1) Variations in the combinations of factor inputs are thought of as the application of alternative production techniques, chosen before the installation of capital equipment, when planning for investment.

Other things being equal, the extent in which variations in the combinations of factor-inputs are feasible is limited within a range of existing techniques. This corresponds to a long-run substitutability between factor-inputs under the concept of a static state of technical knowledge. In a dynamic sense the long-run substitutability is determined by the advancement of technical knowledge, eventually to be identified with the availability of new and more efficient production techniques. The concept of technical progress does not entirely concern the properties of the quantitative relationship between output and factor-inputs, since a great deal of that progress is perceived as new components of the output or improvement in the already existing ones.

Consider a production function expressing the technology of the sector under the form of a technical relationship in flow terms of three factors : output Q , capital K and labour L . The production function is taken as single-valued, continuous and (at least) twice differentiable, and output is exhausted by factor payments to capital and labour if and only if there are constant returns to scale (i.e. constant average productivities in the sense of contributions to output).

K , the measure of capital services is related to capital stock. It is in fact an aggregation of different varieties of capital inputs (a linear homogeneous function of such different varieties of capital inputs). The rate of technical change is invariant with respect to aggregation of the capital stock, provided that aggregation is simply additive and the marginal productivities are invariant (i.e. the rate of return is the same

(1) Murray Brown : On the Theory and Measurement of Technological Change, Cambridge University Press, 1966, p. 65 ff.
W.E.G. Salter: Productivity and Technical Change, Cambridge Univ. Press, 1966, p. 17.

in the component parts of the stock).[1]

Similarly L is a measure of composite labour services regardless of the particular skills and job assignments of individual workers. The function is then specified in terms of different (unique) measures of output obtainable from the various flows of input combinations and therefore does not assume fixed coefficients. Other factors of production such as fixed land or raw material inputs are difficult to document statistically and are therefore omitted in this formulation.[2]

In the simplified version I examine Q is interpreted as actual output from actual inputs within the capacity of the input combinations with factors competitively priced. Regardless of the direction of technical change towards either capital or labour intensive techniques, the range of substitution is limited and does not extend over a minimum requirement for either factor input. So long as satisfactory empirical evidence corroborates this pattern of change in production technology, the relationship between output and factor-inputs in the long-run cannot be identified with a linear or fixed-coefficients production function, where the constant production isoquant in the factor-input space does not provide the concept of substitutability implied by the pattern of change in the long-term production technology we have postulated. The widening set of feasible production techniques in the sense of an increasing number of efficient factor-input combinations is consistent with a non-constant marginal rate of substitution between these factor-inputs along the output isoquant. The connotation of convexity in the shape of the product-curve does not lead however to any conclusion as far as its continuity is concerned, as the concept of a convex to the origin but not continuous isoquant may approximately be obtained by a finite number of alternative

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(1) Benton F. Massel : "Aggregative and Multiplicative Production Functions", Economic Journal, March 1964, pp. 225, 226.

(2) This does not imply that the role of such factors in explaining productivity increases is unimportant, particularly that of raw materials. More extensively on this topic see p. below.

possibilities of factor-input combinations of varying intensity.(1) Infinitesimal changes in the structure of a given output-maximising combination of factor-inputs can be considered as a rather unsatisfactory assumption since neither of the factors of production (i.e. capital and labour) can be perfectly divisible, even though there may be in the long-run a relaxation of purely technical constraints concerning the machinery as a result of technical progress. No a priori reason exists to assume that changes in production technology are a sequence of techniques contrived to reduce marginally the quantity of either factor-input. The invention and practical application of new production techniques is strongly affected by considerations relative to the factor-input cost saved per unit of output produced.

The general practice would suggest a mode of implementation of factor-input substitution as outlined above, but because of technicalities concerning the analysis and the statistical implementation, the somewhat artificial approach of continuity is generally adopted instead. The product isoquant becomes smooth with the implication of an indefinitely large number of production processes, but remains asymptotic to the axes of factor-inputs. Strictly speaking and in accordance with the previous definition of technological change the curve beyond a certain point becomes parallel to both axes, and this point marks the minimum of factor-input requirements.

Under those qualifications we can proceed to specify a production function of the form

$$Q_t = f(K_t, L_t) \qquad (1)$$

where Q is a unique maximum quantity of output corresponding to each combination of inputs. The function defines the dependence of output on

(1) W.E.G. Salter : Op. cit., p. 88.

the two continuously variable and substitutable factors of production and

$$\frac{\partial Q}{\partial K} > 0\,, \quad \frac{\partial^2 Q}{\partial K^2} < 0 \quad \text{and} \quad \frac{\partial Q}{\partial L} > 0\,, \quad \frac{\partial^2 Q}{\partial L^2} < 0$$

so that the marginal products are positive and decreasing.

The practical problem of estimating technological change over time requires a distinction between movements along the same production function and shifts of the function itself. Such shifts can be represented by a time variable t, which is included as an index of technology in its current state, so that $Q_t = f(K, L, t)$.

With capital/labour ratios and profit shares not affected by changes in input proportions, all the basic relationships of factor proportions become general functions of the capital/labour ratios alone, independent of the index t.[1] In this case t can be factored out of the equation and A instead of being an argument in the function can now be expressed as a factor of proportionality, so that $Q_t = A_t f(K, L)$ where the scale factor A represents as an index the level of technology, i.e. the volume of capacity-output produced per unit of given factor-input $(A = Q/K^a L^b)$. Then if $n = a + b$

$$f(hK, hL) = A(hK)^a (hL)^b = h^{a+b} A K^a L^b = h^{a+b} Q$$

where parameter n gives the degree of homogeneity of the function.

From $Q_t = A_t f(K, L)$ differentiating over time we obtain

$$\frac{dQ}{dt} = \frac{dA}{dt} f(K_t, L_t) + A \frac{\partial f}{\partial K} \frac{dK}{dt} + A \frac{\partial f}{\partial L} \frac{dL}{dt}\,.$$

If factors are paid their marginal products the marginality conditions are expressed by

$$\frac{\partial Q}{\partial K} = \frac{r}{p}\,, \quad \frac{\partial Q}{\partial L} = \frac{w}{p} \quad \text{and} \quad \frac{\partial Q}{\partial L} \Big/ \frac{\partial Q}{\partial K} = \frac{w}{r} = \frac{hK}{aL}$$

where p is the price of output, r the price of capital and w the price of labour. If w_K and w_L are the shares of capital and labour in income, which are computed empirically for each year in Ch.Nine, E, then

(1) M.J. Beckman and R. Sato: "Aggregate Production Functions and Types of Technical Progress: A Statistical Analysis", A.E.R., Vol. LIX, March 1969 p.89.
J.M. Cassels: "On the Law of Variable Proportions", Readings in the Theory of Income Distribution, A.E.A., 1961, p. 104 ff.
James W. Christian: "The Dynamics of Economic Growth, Technological Progress and Institutional Change", Journal of Economic Issues, 2, 1968, p.298 ff.

$$w_K = rK/pQ = \frac{\partial Q}{\partial K}\frac{K}{Q} = A\frac{\partial f}{\partial K}\frac{K}{Q} \quad \text{and}$$

$$w_L = wL/pQ = \frac{\partial Q}{\partial L}\frac{L}{Q} = A\frac{\partial f}{\partial L}\frac{L}{Q} \quad .$$

Dividing the differentiated form of $Q_t = A_t f(K, L)$ above by Q throughout and substituting the above factor shares we obtain

$$\frac{\frac{dQ}{dt}}{Q} = \frac{\frac{dA}{dt}}{A} + w_K\frac{\frac{dK}{dt}}{K} + w_L\frac{\frac{dL}{dt}}{L} \quad .$$

In a function of the form $nQ = f(K, L)$, for given levels of output we move along the same isoquant. Hence

$$dQ = f_K\,dK + f_L\,dL = 0$$

along an isoquant, the absolute value of whose slope is the marginal rate of substitution $MRS = -\frac{dK}{dL}$. The proportional change in the factor-input ratio following a proportional change in the MRS is called elasticity of substitution. If we denote the latter by σ, then

$$\sigma = \frac{d \log K/L}{d \log dK/dL} > 0 \, .$$

If $n = 1$, we then have a degree of homogeneity equal to unity, constant therefore returns to scale. An important feature of homogeneous functions (from Euler's theorem) is that the degree of homogeneity is given by the sum of the partial derivatives weighted by the quantity of the factor, i.e.

$$f_K K + f_L L = nQ \qquad \text{or} \qquad \frac{\partial Q}{K}K + \frac{\partial Q}{L}L = nQ \, .$$

In the case of constant returns to scale (i.e. $n = a + b = 1$), the function can be reduced to a two-dimensional form in per capita terms :

$$\frac{Q}{L} = A_t\,(K/L)^a$$

where a is a positive parameter.(1) The implication in a neoclassical context (as already mentioned in the case of the more general function) is that

$$\frac{\partial Q}{\partial K} = a\,A\,K^{a-1}\,L^b = a\left(\frac{Q}{K}\right) \qquad \text{and}$$

(1) F. Van Den Bogaerde: "Constant Returns to Scale: Applications and Implications", South African Journal of Economics, Sept. 1970, p. 223 ff.

$$w_K = rK/pQ = \frac{\partial Q}{\partial K}\frac{K}{Q} = A\frac{\partial f}{\partial K}\frac{K}{Q} \quad \text{and}$$

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(1) F. Van Den Bogaerde: "Constant Returns to Scale: Applications and Implications", South African Journal of Economics, Sept. 1970, p. 223 ff.

$$\frac{\partial Q}{\partial L} = b A K^{a} L^{b-1} = b\left(\frac{Q}{L}\right) .$$

In this case the marginal rate of substitution MRS is

$$MRS = \frac{\partial Q}{\partial L} \Big/ \frac{\partial Q}{\partial K} = b \frac{Q}{L} \Big/ a \frac{Q}{K} = \frac{b}{a} \frac{K}{L}$$

and to derive the elasticity of substitution we set[1]

$$\log (MRS) = \log \frac{b}{a} + \log \frac{K}{L} \qquad \text{and then}$$

$$\sigma = \frac{d \log K/L}{d \log (MRS)} = 1 .$$

Further marginality conditions now take the form

$$f\left(\frac{K}{L}\right) = \left(\frac{K}{L}\right)^{a}$$

$$f'(K/L) = \frac{a}{(K/L)^{1-a}} > 0 \quad \text{where} \quad f'(K/L) = \frac{\partial Q}{\partial K} \quad \text{and}$$

$$\frac{\partial Q}{\partial L} = f(K/L) - (K/L) f'(K/L) = (1-a)(K/L)^{a} \quad \text{and}$$

$$f''(K/L) = -\frac{a(1-a)}{(K/L)^{2-a}} < 0 ,$$

i.e. the marginal product of capital decreases with an increase in the capital-labour ratio. The decreasing slope of the isoquants defines the marginal rate of substitution :

$$MRS = \frac{1-a\,(K/L)^{a}}{a\,(K/L)^{-(1-a)}} = (K/L)\frac{1-a}{a} .$$

The marginal product assumptions in this final form are subject to the condition that the marginal product of capital (slope of the tangent to the unit isoquant on the plane Q/L , K/L) declines as K/L increases, tending to zero at infinite K/L and being infinite with K/L at zero level :

$$f'(K/L) \longrightarrow \infty \quad \text{as} \quad (K/L) \longrightarrow 0 \qquad \text{and}$$

$$f'(K/L) \longrightarrow 0 \quad \text{as} \quad (K/L) \longrightarrow \infty .$$

Obtaining the derivatives with respect to time of the function in the form $Q/L = A_t (K/L)^{a}$ we have (with derivatives in Newton dotted form)

(1) Kenneth F. Wallis: Topics in Applied Econometrics, Gray-Mills, London, 1973, pp. 29-31.

$$\dot{Q/L} = \frac{\dot{Q}}{L} - \frac{Q}{L^2}\dot{L} \qquad \text{and}$$

$$\dot{K/L} = \frac{\dot{Q}}{K} - \frac{Q}{K^2}\dot{K} \; . \qquad \text{Hence}$$

$$\frac{\dot{(Q/L)}}{(Q/L)} = \frac{\dot{Q}}{Q} - \frac{\dot{L}}{L} \qquad \text{and}$$

$$\frac{\dot{(K/L)}}{(K/L)} = \frac{\dot{K}}{K} - \frac{\dot{L}}{L} \; . \qquad \text{We therefore have}$$

$$\frac{\dot{Q/L}}{Q/L} + \frac{\dot{L}}{L} = \frac{\dot{A}}{A} + w_K\left(\frac{\dot{K/L}}{K/L} + \frac{\dot{L}}{L}\right) + w_L\frac{\dot{L}}{L}$$

and given that we assume that $w_K + w_L = 1$,

$$\frac{\dot{Q/L}}{Q/L} = \frac{\dot{A}}{A} + w_K\frac{\dot{K/L}}{K/L} \; .$$

With the assumption of a function linear, homogeneous to degree one in K and L, we observe that the function has the property that it is equally capital- and labour-augmenting, i.e. Hicks-neutral.(1) More specifically Hicksian neutrality assumes that technological change does not affect the basic relationships of factor proportions (factor shares which are general functions of capital-labour ratios and the index t) and of the marginal rate of substitution.(2)

Technological change is neutral in the sense that it does not alter the ratio between marginal productivities for given factor inputs. Essentially the postulation of Hicks-neutrality is based on the argument that each production process in use is characterised by a fixed factor-input coefficient which does not change until the capital equipment is scrapped. Disembodied technical change may reduce the cost per unit of output, but its implementation does not affect the factor proportions, since the reduction of the cost is the result of increased productivity of a

(1) J.R. Hicks: The Theory of Wages, St. Martin's, New York, 1966, Ch.VI.
(2) R. Sato and M.J. Beckman: "Neutral Inventions and Production Functions", Review of Economic Studies, Vol. XXXV, 1968, p. 59.

given factor-input combination.

The shift in the production function and the underlying improved efficiency of the combined factor-inputs is identified with the effect of a technological improvement which is disembodied.(1) It is disembodied as long as the combined input ratio is realised without the installation of new capital equipment in the sense of machines qualitatively different from the existing stock, or labour skills of a different order. The essential feature of this kind of technical advancement is that it can be applied to all production processes employed, regardless of the age and type of capital equipment.(2) As such it can be explained by the introduction of more sophisticated management techniques and other methods of organization. Benefits of such technical change are freely available, arriving like "manna from heaven". As there is no distinction between the augmentation of K and that of L , the progress term A incorporates increments of "human capital" per person. Shifts in the production function leave the marginal rate of substitution unchanged at a given factor-ratio and the isoquants shift in a uniform displacement parallel to each other (isoelastically). In other words as long as the disembodiment hypothesis means that neither factor-input serves as a conveyor of technical progress, the form of neutrality is rather allied in nature to an isoelastic shift of the product curve and this concept implies that $d \log (Q/L) = d \log (K/L)$.

One crucial assumption in the model is that the marginal product of capital equals the rental value of capital and that the marginal product of labour equals the relative share of labour. In the case where this holds with constant returns to scale the sum of the value of the marginal products of the two factors will exhaust the value of the total product. There is a number of reasons why this essentially microeconomic approach may not necessarily apply at the macroeconomic level at all times. Some theories present forces which may change the distribution

(1) Robert M. Solow: "Technical Change and the Aggregate Production Function", Review of Economics and Statistics, Vol. XXXIX, 1957, p.312 ff.
(2) R.G.D. Allen: Macro-Economic Theory, Macmillan, London, 1967, p.236.
(3) Edwin Burmeister and Rodney Dobell: "Disembodied Technological Change with Several Factors", Journal of Economic Theory, 1, 1-8, 1969, p.6.

of income from the marginality levels, such as the existence of sociological factors behind the supply and demand curves,[1] the unsettling effect of increasing population and capital formation,[2] or the existence of aggregate demand pressures on the demand curves for factors and commodities, assumed constant by the marginal productivity theory of distribution.[3] Alternatively, other authors have viewed distortions in the factor shares not in terms of changes in relative factor supplies or shifts in the production function, but rather in the context of mark-up theories, where imperfect competition and monopolistic practices hold the relative factor prices independent of the supply and demand factors.[4] The existence of monopolies, trade unions and raw material shortages could accordingly affect the relative cost curves.[5]

A large number of macroeconomic theories of income distribution have accordingly been forwarded, some assuming constant profit rates,[6] others treating the business propensity to save as exogenous[7] and others without explicitly assuming full employment allowing the key endogenous variables in the system automatically to determine the distribution of income.[8] Furthermore, macroeconometric models sometimes formulate the share of profits in income not on marginal productivity assumptions, but as a function of proportionate changes in prices, of

(1) Alfred Marshall: Principles in Economics. Macmillan, London, 1890.
(2) John Bates Clark: Op.cit., 1899.
(3) John Maynard Keynes: Op.cit., 1936.
(4) M. Kalecki: Essays in the Theory of Economic Fluctuations. Allen and Unwin, London, 1939, Ch. I.
Nicholas Kaldor: "Alternative Theories of Distribution", Review of Economic Studies. XXIII, No. 2, 1956, p. 92.
M.W. Reder: "Alternative Theories of Labor's Share", Allocation of Economic Resources. Stanford Univ. Press, 1959, p. 181 ff.
(5) M. Kalecki: "The Determinants of the Distribution of the National Income", Econometrica. 6, 1938, p. 97 ff.
(6) Nicholas Kaldor: "A Model of Economic Growth", Economic Journal. 67, 1957, p. 591.
F.H. Hahn: "The Share of Wages in the National Income", Oxford Economic Papers. 3, 1951, p. 147 ff.
(7) Kenneth E. Boulding: A Reconstruction of Economics. New York, 1950.
(8) E. Schneider: "Income and Income Distribution in Macro-Economic Theory", International Economic Papers. Macmillan, London, 8, 1958.

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(5) M. Kalecki: "The Determinants of the Distribution of the National Income", Econometrica. 6, 1938, p. 97 ff.
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(8) E. Schneider: "Income and Income Distribution in Macro-Economic Theory", International Economic Papers. Macmillan, London, 8, 1958.

the proportionate difference between the per capita national income at two points in time, or of changes in sales or inventory investments.(1)

The identification of computed income-shares and production elasticities may therefore come under attack in an economy like the Greek one, sometimes operating under conditions of monopolistic or oligopolistic factor pricing for some of the reasons outlined above. Furthermore the manufacturing sector was not stationary as defined by the marginal theory of distribution but quick-growing and therefore subject to windfall gains and losses indicative of disturbances in the relations of relative income payments and marginal factor contributions.

In view of the criticism that can be brought against the function, it was thought necessary not simply to try and justify its use on the gounds of simplicity or convenience which would eliminate in measurement the advantage more sophisticated but much less easily statistically identified functions may have, but also to look for available evidence in the Greek manufacturing industry sectors that would support our assumptions concerning income shares and production elasticities.

Such evidence comes from two studies on a sample of mainly large-scale industries, one for the year 1960 and the other for 1960 and 1961.(2) Both studies are on a cross-section basis at a high level of disaggregation. The thing to look for in those studies are the elasticities of production obtained by least squares, in Cobb-Douglas production functions with two factors of production, capital and labour, under the assumption of constant returns to scale. As far the latter assumption is concerned, the first study (by Koutsoyianni - Kokkova) performs a Tintner test on the cross section of industries by sector, which shows that in the year 1960 in 20 out of 25 sub-sectors the sum of parameters a + b was not significantly different from unity at the 1 per cent level of significance (branch 29 at 5 per cent level of significance),

(1) The alternative models and income-shares theories are discussed in P.E. Hart: "The Factor Distribution of Income in the U.K. 1870-1963", P.E. Hart. Ed., Studies in Profit, Business Saving and Investment in the U.K. 1920-1963, Allen and Unwin, London, 1968, Vol.II, p. 17 ff.

(2) A. Koutsoyianni-Kokkova: Production Functions of the Greek Industry. Center of Planning and Economic Research, Economic Monograph Series No. 10, Athens, 1964.
C.G. Drakatos: Production Functions of the Greek Industry. Bank of Greece, Economic Research Division, Special Studies No.8, Athens, 1964.

TABLE LXVII

Production Elasticities from Cross Section Studies

ISIC Code No.	Source : Koutsoyianni - Kokkova a_1	Source : Koutsoyianni - Kokkova a_2	Source : Drakatos (Selected Sectors only) a_1	Source : Drakatos (Selected Sectors only) a_2	
20	.8707	.1293			
20 a	.7593	.2407			
20 b	.6794	.3206			
20 γ	.9326	.0674			
21	.7940	.2060			
22	.9122	.0878			
22 a	.7233	.2767			
23	.7565	.2435			
23 a	.8319	.1681	.759	.241	(data for year 1961)
23 b	.9377	.0623			
23 γ	.6810	.3190			
24	.8447	.1553			
25	.9083	.0917			
26	.9331	.0669			
27-28	.7179	.2821			
29	.8487	.1513			
31 a	1.0797	-0.0797	.720	.280	(data for year 1960)
30-31-32	.8308	.1692			
33	.7806	.2194			
34	.8932	.1108	.739	.261	(data for year 1961)
35	.8267	.1733			
36	.9423	.0577			
37	.9524	.0476			
38	.8575	.1425			
39	.7584	.2416			

Note : a_1 in this context is the elasticity of of output with respect to labour.
a_2 is the elasticity of output with respect to capital.

All estimates under the constraint $a_1 + a_2 = 1$.

The Koutsoyianni - Kokkova sample is from the National Statistical Service and covers 500 firms (8.5% of all firms over 10 employees) and producing 53.9% of all value-added of the over-10-employees-establishments. All data for the year 1960.
The Drakatos sample comes from Secretariat of the Currency Committee, Bank Loans Division, and covers 214 firms , producing 28% of all over-10-employees-establishments' value added in 1960. Results are given for certain sectors only.

Sources: See Note ( ) in text, p.

so that those industries are seen to have operated with constant returns to scale. In three subsectors we observe decreasing returns to scale, i.e. $a + b < 0$ (tobacco leaves procession, woolen industry and basic metal industry). In another two subsectors we observe increasing returns to scale, i.e. $a + b > 0$ (non-metallic minerals and electrical equipment). Of those five subsectors three are found by Drakatos in his study using a different sample to have constant returns to scale, leaving tobacco leaves procession as the one sector with increasing returns to scale and non-metallic minerals with decreasing returns to scale.(1)

On the assumption of constant returns then Koutsoyianni-Kokkova and Drakatos obtain the elasticities of output with respect to labour and capital as given in Table LXVII . The level of aggregation is more detailed than ours so that direct comparisons are difficult, but all things taken into account it is remarkable how close most of those elasticities come to our factor shares estimates (Table LXVI). Of course the validity of those findings is restricted by the rather small sample of industries, the cross sectional nature of the test for one particular year alone and the differences in the level of aggregation. In view of those qualifications I have to note that it is still an <u>assumption</u> I make in equating factor shares and production elasticities. It is, however, important that the available evidence (although perhaps not entirely conclusive) does not seem to contradict this assumption to any great extent.

A few more remarks on the function employed could be made here. First that by necessity a number of other inputs were omitted from the function, which could perhaps explain variations in output, such as the consumption of fuels and raw materials. Information relevant to such inputs is unfortunately unavailable for the years before 1963, so that I did not attempt to include any estimates of those. Some implications of this omission are discussed in Chapter Ten, Para. C., p. below. In what concerns the actual capital and labour inputs employed in our

(1) We note in another study on the productivity of industries by size for the year 1963 that there is no evidence of increasing returns in the industry taken at the two digit level. See Chr.G. Athanasopoulos: <u>Size and Efficiency in Greek Manufacturing</u> (in Greek), Sakkoulas, Athens, 1970, pp. 135-36.

function. Statistical documentation was so poor over that period that we were unable to bring about adjustments in the basic measures of factor inputs other than the adjustment in the use of capital services to take account of underutilization of capacity. This means that the measure of labour stock may not reflect precisely the intensity of labour services, but unfortunately no measure of hours worked per week by sector of the industry were available. Quality adjustments in the labour input were also difficult to bring about as we do not know the average numbers of men and women employed by sector, nor do we have education statistics to use for the construction of a proxy relating growth of education per man to growth of labour efficiency. Different types of labour in terms of manual and other workers are not sufficiently documented either.(1) Furthermore any quality adjustment of the capital stock would be pure guesswork, particularly with a stock of mechanical equipment and machinery deriving from such diverse sources and installed in Greece not necessarily when the design was new but often at a later date, so that it embodied the technology of an unknown or not sufficiently specified period in the past. The age (or date of construction or design) of equipment is particularly difficult to measure in practice and in Greece many component parts of a variety of vintages are often mere additions due to repairs or have been installed at various times, different from that denoted by the particular vintage of the main part of installed machinery. This fact did not facilitate an effort to measure the differing efficiency of vintages in this study so that unadjusted estimates were used in the end.

One last valid reservation should be added here, namely that the time series estimates of the production function may simply reflect trends in Q, K, and L, which time trends could be compared directly, without an estimate of macroeconomic production functions.(2) In other words the testability of the function itself could be channeled as the various explanatory variables stand in an exact or almost exact (linear)

(1) Cf. D.W. Jorgenson and Z. Griliches: "The Explanation of Productivity Change", Review of Economic Studies, Vol. XXXIV, No. 99, 1967.
(2) E.H. Phelps Brown: "The Meaning of the Fitted Cobb-Douglas Function", Quarterly Journal of Economics, 71, 1957, p. 546 ff.

relation to each other.[1] The applicability of the function itself in this light can not be viewed a priori but has to be assesed in each individual case. But one can not fail to notice that a number of prominent theorists still find the production function approach useful for research as an empirical tool.[2]

Despite the limitations of the production function we have adopted in this study and of some of the features outlined above, which make it difficult to accept without qualifications all the assumptions, if one is careful not to ignore those limitations of the technique (which at any rate would have been more severe with alternative formulations given the data we can employ) and if one takes care to read through the results critically, then surely the residual factor although not the perfect measure of technical change in its purest form, is still the best indicator we can hope to obtain with the currently available statistical evidence.

(1) Edward J. Kane: Economic Statistics and Econometrics, Harper and Row, New York, 1968, pp. 277-78.

(2) H. Houthakker: "The Pareto Distribution and the Cobb-Douglas Function in Activity Analysis", Review of Economic Studies, Vol. 23, 1955-56.
Wasily W. Leontief: "An International Comparison of Factor Costs and Factor Use", A.E.R., Vol. LIV, 1964, p. 335.
M. Bronfenbrenner: Income Distribution Theory, Macmillan, London, 1971, p. 387.

B. The Adjustment for Underutilised Capacity

We may now consider our assumption of an actual output measure deriving from input combinations at capacity level. Capacity output is defined as the quantity of output which can be produced per unit of time with a given supply of plant and equipment, labour and materials.(1) One could distinguish between the engineer's concept of capacity and the economist's. The former in a physical sense, defines output per unit of time with a given stock of capital facilities, as the one obtained at the minimum of the long-run average cost curve.(2) The latter, under neoclassical assumptions as well, sets the short-run average cost per unit of output at a minimum for capacity operation.(3) With output exceeding or falling short of capacity, unit costs increase along the U-shaped cost function because of decreases in efficiency due to non-optimal use of existing physical facilities.(4) Even if the usefulness of the distinction between short- and long-run cost curves is sometimes questioned,(5) there is agreement that actual output depends on the

(1) U.S. Congress; Joint Committee Print: Measures of Productive Capacity, Report of Subcommittee on Economic Statistics, U.S. Government Printing Office, Washington, D.C., 1962, p. 6 ff.
Almarin Phillips: "An Appraisal of Measures of Capacity", A.E.R., Papers and Proceedings, 53, May, 1963, p. 275 ff.

(2) Franck de Leeuw: "The Concept of Capacity", Journal of American Statistical Association, 57, December, 1962, p. 826 ff. Reprinted from American Statistical Association: Proceedings of the Business and Economic Statistics Section, 1961, p. 320 ff.
B.G. Hickman: Investment Demand and U.S. Economic Growth, Brooking, Washington, D.C., 1965.

(3) George J. Stigler: The Theory of Price, Macmillan, London, 1966, pp. 156-58.
Armen Alchian: "Costs and Outputs", The Allocation of Economic Resources, Essays in Honour of B.F. Halley, M. Abramovits, Ed., Stanford University Press, 1959.

(4) Helen Malenbaum: "Capacity Balance in the Chemical Industry", Essays in Industrial Econometrics, Vol. II, Wharton School, University of Pennsylvania, 1969, p. 149.

(5) R.E. Lucas: "Adjustment Costs and the Theory of Supply", Journal of Political Economy, Part 1, 11, August, 1967.

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(1) U.S. Congress; Joint Committee Print: Measures of Productive Capacity. Report of Subcommittee on Economic Statistics, U.S. Government Printing Office, Washington, D.C., 1962, p. 6 ff.
Almarin Phillips: "An Appraisal of Measures of Capacity", A.E.R., Papers and Proceedings, 53, May, 1963, p. 275 ff.

(2) Franck de Leeuw: "The Concept of Capacity", Journal of American Statistical Association, 57, December, 1962, p. 826 ff. Reprinted from American Statistical Association: Proceedings of the Business and Economic Statistics Section, 1961, p. 320 ff.
B.G. Hickman: Investment Demand and U.S. Economic Growth, Brooking, Washington, D.C., 1965.

(3) George J. Stigler: The Theory of Price, Macmillan, London, 1966, pp. 156-58.
Armen Alchian: "Costs and Outputs", The Allocation of Economic Resources, Essays in Honour of B.F. Halley, M. Abramovits, Ed., Stanford University Press, 1959.

(4) Helen Malenbaum: "Capacity Balance in the Chemical Industry", Essays in Industrial Econometrics, Vol. II, Wharton School, University of Pennsylvania, 1969, p. 149.

(5) R.E. Lucas: "Adjustment Costs and the Theory of Supply", Journal of Political Economy, Part 1, 11, August, 1967.

quantity of utilized and not of available factor services, so that capital stock measures can well represent idle structures and equipment rather than actually employed inputs.

The method employed in this thesis is a variation of the under-utilization adjustment presented by B.F. Massel[1] to convert capital in existence to capital in use. This method views the ratio of capital in use to labour in use as the product of two ratios: the capital-output ratio and the capital-labour ratio. Changes in the average productivity of capital are small in the short run if we assume that factor proportions are near-constant in the short term. A trend line fitted by least squares to the capital-output ratio in such a case can be derived, and deviations from the trend line can be thought to represent fluctuations in employment relative to its capacity level, and are therefore largely the result of the capital figures' reflecting idle capacity. The latter implies the Solow assumption that capital and labour are laid off proportionately in undercapacity years.[2] To obtain this result one has only to multiply the observed changes in the output-labour ratio to the trend values of the capital-output ratio. Massel only used "full-employment of labour" years for the capital-output ratio regressions to give a "full capacity" trend line so that the deviations could be measured downwards from this measure of reference. It is not clear how one decides on the full employment years if no indication exists as to the actual ceiling of labour supply by industry in each year.

The alternative I employ here is to use all observations for the calculation of the trend in the capital-output ratio and then as to the actual setting of the level of undercapacity around which the cyclically adjusted series of capital-labour ratio moves, to make use of the results of a special survey on capacity levels for

(1) Benton F. Massel: "Capital Formation and Technological Change in U.S. Manufacturing", Review of Economics and Statistics, XLII, May 1960, pp. 184-85.

(2) Robert M. Solow: "Technical Progress, Capital Formation and Economic Growth", A.E.R., Papers and Proceedings, Vol. LII, June 1962. R.J. Ball and E. Smolensky: "The Structure of Multiplier-Accelerator Models of the U.S., 1909-1951", International Economic Review, September 1961.

TABLE LXVIII

Net Capital Stock Adjusted for Capacity Utilization

1958 - 1966 . At Constant 1958 Prices

	20-22		23		24	
	Capital Stock	Adjustment	Capital Stock	Adjustment	Capital Stock	Adjustment
1958	1 735 232 000	.7135	1 378 916 000	.5180	89 564 400	.8293
1959	1 897 219 400	.7222	1 202 735 700	.4561	88 793 200	.6388
1960	2 007 555 200	.6764	1 337 322 400	.5116	105 275 800	.5186
1961	2 051 744 400	.5906	1 303 500 000	.5000	121 890 000	.5100
1962	2 168 506 800	.5556	1 355 283 100	.5251	130 224 000	.5426
1963	2 485 812 000	.5860	1 331 635 800	.4534	152 824 600	.5833
1964	2 881 822 000	.6572	1 409 658 300	.4713	169 243 200	.5256
1965	3 260 520 900	.6797	1 561 756 700	.4969	192 614 400	.5472
1966	3 718 607 800	.7222	1 473 294 900	.4543	207 721 200	.5452

	25-26		27-28		29-32	
	Capital Stock	Adjustment	Capital Stock	Adjustment	Capital Stock	Adjustment
1958	86 421 800	.3286	406 958 400	.5748	969 862 800	.4204
1959	90 588 300	.3201	412 101 600	.5921	1 233 523 200	.4589
1960	102 016 200	.3198	425 544 000	.5960	1 472 250 500	.5383
1961	110 880 000	.3300	439 082 000	.5530	1 348 987 200	.5104
1962	117 474 500	.3445	453 182 400	.5722	1 264 971 500	.4615
1963	128 812 500	.3435	494 852 800	.5144	1 405 363 200	.5048
1964	150 388 000	.2870	497 445 000	.5102	1 367 903 600	.4949
1965	166 284 000	.2682	504 674 200	.4502	1 573 409 600	.5416
1966	176 105 200	.2701	540 056 000	.3971	1 516 426 500	.5293

	33		34		35-37	
	Capital Stock	Adjustment	Capital Stock	Adjustment	Capital Stock	Adjustment
1958	607 415 000	.5926	136 416 000	.3248	573 595 200	.3918
1959	635 976 000	.5808	158 059 200	.3576	563 620 500	.3765
1960	745 039 000	.6670	234 964 500	.5053	626 272 400	.4153
1961	827 820 000	.7300	254 520 000	.4200	688 705 200	.4449
1962	964 610 900	.7403	284 423 400	.2619	700 536 600	.4482
1963	1 101 005 400	.7253	332 241 300	.2799	668 955 000	.4025
1964	1 314 773 200	.7276	355 853 400	.3073	758 310 000	.4025
1965	1 634 679 800	.8021	369 825 200	.1294	768 168 000	.3632
1966	1 687 619 000	.7243	857 048 600	.2762	799 671 600	.3276

	38		39	
	Capital Stock	Adjustment	Capital Stock	Adjustment
1958	116 928 700	.3409	399 815 200	.7039
1959	164 992 800	.3381	430 677 600	.7746
1960	214 735 200	.2732	405 918 000	.7517
1961	327 940 000	.3800	419 900 000	.8500
1962	406 308 000	.4146	432 129 400	.9689
1963	484 744 400	.4679	422 000 000	1.0000
1964	562 119 800	.4334	394 000 000	1.0000
1965	648 381 800	.4378	376 450 700	.9829
1966	713 830 000	.4420	350 000 000	1.0000

Note : All entries in drachmas. Adjustment for branch 39, years 1963, 1964, 1966 calculated at full capacity level. For method of adjustment see text.

the manufacturing industry by sector for the year 1961 conducted by the Center of Economic Research in April-July 1962.(1) The survey gives total output in relation to total potential of the existing plant on a three-shift basis. The number of establishments surveyed was over one quarter of those covered by the Annual Industrial Survey, so that the reliability of the findings is thought acceptable by this author, although not equally satisfactory in all branches. In wood an furniture industries and paper-printing the sample was rather smaller. The findings nevertheless were adopted on the basis of the good sampling techniques used by the Center and the unavailability of alternative estimates. The scale of production as per cent of total capacity for the entire manufacturing industry was given as 59% , but varied widely from 100% in the manufacture of products of petroleum to 33% in wood and leather industries. Similar techniques in determining underutilized capacity and similar problems are often encountered both at the micro and the macro level.(2)

Net capital stock estimates adjusted for capacity underutilisation are given in Table LXVIII . The 1961 level given by the survey by industry is found below. The estimates of capital/output ra-

Percentage of Installed Capacity Utilization: 1961

ISIC Code		Scale of Production as % of Capacity	ISIC Code		Scale of Production as % of Capacity
20-22	Food-Drink-Tobacco	59.06	33	Non-metallic Minerals	73.00
23	Textiles	50.00	34	Basic Metal Industries	42.00
24	Clothing-Footwear	51.00	35-37	Metal Prod.-Machinery-Electr. Equipment	44.49
25-26	Wood-Cork-Furniture	33.00			
27-28	Paper-Printing	55.30	38	Transport Equipment	38.00
29-32	Leather-Rubber-Plastics Chemicals-Petrol	51.04	39	Miscellaneous Industries	85.00

Note : In industries groupped together the capacity rates were computed on a weighted average basis from the original disaggregated Survey information.

Source: Center of Economic Research; Special Survey, April-July 1962. Published in George Coutsoumaris: 1963, Op.cit., pp. 304-5 in a more disaggregated form.

tios used (and the resultant estimated line) covered the years 1950 to 1966. Denoting by a bar the fitted line estimates of the K/O ra-

(1) George Coutsoumaris: Op.cit., pp. 304-5.

(2) T.W. Anderson: "Some Statistical Problems in Relating Experimental Data to Production Performance of a Production Process", Journal of the American Statistical Association, Vol. 50, 1961.

tio, the adjusted estimates were accordingly computed as follows

$$K_N Adj = (K_N) \left[(K_N/O \times O/L) / K_N/L \right] (U_{61})$$

where N stands for values net of depreciation and U_{61} is the above-mentioned Special Survey measure of underutilised capacity.(1) O is a measure of output in terms of value added and its specification is discussed in the paragraph which follows.

(1) The 1961 level of underutilised capacity is a point of reference for the adjustment of the line in each case as the fluctuations around the fitted line dictate.

C._ Output_by Sector_of the Industry_

In the context of my analysis a measure of real national product in a series net of depreciation would have been desirable.(1) It is unfortunate that such a measure can only be estimated for the period after 1963 from Annual Industrial Survey information. This can be of little use in my analysis and gross domestic product entries in terms of gross value added, given by the National Accounts are used instead. The implicit assumption is that cyclically and secularly such estimates vary in proportion with the (unknown) net national income by sector. In fact the breakdown of value added by sector of the manufacturing industry as given by the National Accounts is conditioning the level of aggregation I employ in my analysis, as some of the industries are grouped together (for instance ISIC Code No. 20-22, 25-26, 27-28, 29-32, 35-37). As no better estimates at a more disaggregated level are available, the existence of the so grouped data has dictated the general layout of industries throughout this thesis.

The output entries (value added) as given by the National Accounts in the latest revised version are given in Table LXIX for the entire period 1953-1966.(2) I note that the National Accounts issuing authority was transferred from the Ministry of Coordination to the National Statistical Service and a new revised set of National Product estimates was introduced in 1972 from which I derive the entries I use in this analysis.

The implication of the use of value added rather than gross out-

(1) Benton F. Massel: Op.cit., 1960, p 183.
(2) N.S.S.G.: National Accounts, Op.cit., 1972, pp. 120-21.

TABLE LXIX

Gross Domestic Product (in Terms of Value Added)
(At Constant 1958 Prices)

	20-22 Food Drink Tobacco	23 Textiles	24 Clothing Footwear	25-26 Wood Cork Furniture	27-28 Paper Printing	29-32 Leather-Rubber Plastics Chemicals-Petrol
1953	2 399	1 654	1 553	408	341	446
1954	2 823	1 754	1 734	457	335	519
1955	2 943	2 072	1 733	545	397	609
1956	3 337	2 097	1 899	628	475	696
1957	3 321	2 258	2 102	744	484	805
1958	3 453	2 425	2 213	806	559	923
1959	3 653	2 205	1 947	835	597	1 297
1960	3 492	2 576	2 077	929	652	1 593
1961	3 710	2 612	2 184	998	714	1 567
1962	3 805	2 848	2 137	1 045	785	1 586
1963	4 237	2 942	2 314	1 133	917	1 914
1964	4 775	3 282	2 378	1 308	991	2 039
1965	5 256	3 844	2 525	1 430	1 087	2 590
1966	5 836	3 845	2 552	1 498	1 266	2 787

	33 Non-metallic Minerals	34 Basic Metal Industries	35-37 Metal Prod. Machinery Electr.Eq.	38 Transport Equipment	39 Miscellaneous Industries
1953	508	62	990	190	216
1954	506	94	1 097	221	229
1955	675	107	1 151	244	235
1956	843	132	1 227	256	263
1957	828	163	1 399	269	289
1958	860	196	1 652	318	333
1959	874	223	1 702	358	382
1960	995	324	1 988	420	385
1961	1 075	344	2 304	584	428
1962	1 219	377	2 477	664	476
1963	1 355	432	2 508	732	523
1964	1 577	454	3 025	789	531
1965	1 912	463	3 276	850	547
1966	1 926	1 054	3 662	878	570

Source : National Statistical Service: National Accounts of Greece, 1948-1970, X:2, No. 21, Revised Estimates of Earlier National Accounts after the Issuing Authority was Transferred from the Ministry of Coordination to the National Statistical Service, Athens, May, 1972, pp. 120-121.

put estimates is that raw materials cancel out in those transactions between productive units or sectors which produce them and use them as inputs for their own production, but changes in stocks of raw materials should in principle be included as an independent variable, as indeed should raw materials imported from abroad which do not cancel out. It is unfortunate that lack of statistical documentation both on the gross output side and on the raw materials side precludes any such considerations in my study.

There exist two tests for evidence of a constant relation between gross output and raw materials in Greek manufacturing.[1] One is by A. Koutsoyianni-Kokkova and the other by K. Drakatos. Both are on a cross section basis, the one for the year 1960 and the other for 1961. Both are for small samples of large-scale industries. The equation fitted was $P = a + bM$. If the correlation coefficient in such a test is high and parameter b is statistically not significantly different from unity, then the P/M ratio is shown to be constant.[2]

Koutsoyianni-Kokkova fits the equation in cross section to industries within each of 25 different sectors. In 16 there is a constant P/M ratio (i.e. b is not different from unity at the

(1) The factor of production "land" has also been omitted from the function, as it can be considered constant, at least in the context of advanced economies.

(2) V. Murti and V. Sastry: "Production Functions for Indian Industry", Econometrica, Vol.XXV, April 1957, p. 210-12.
L.R. Klein: An Introduction to Econometrics, Prentice-Hall, London, 1962, p. 97.

5 per cent significance level).[1] Drakatos fits the equation for data from a different source in eight separate selected sub-sectors in cross section and finds constant P/M ratios in all eight, including four of those where Koutsoyianni-Kokkova obtains non-constant ratios for the previous year 1960.[2]

Those findings are not conclusive evidence in our case, because they derive from cross-section analysis for one particular year alone and at a level of aggregation different from ours (25 sectors for Koutsoyianni-Kokkova versus 11 of our own). Furthermore their sample is pretty small (8.5% of all enterprises of $^{O}10$ employment, none for $^{U}10$ for Koutsoyianni-Kokkova; 3.7% of $^{O}10$ enterprises for Drakatos). Bearing in mind this evidence we proceed with the function as specified in Chapter Ten, para. A and B, to obtain the pattern and direction of technological relationships in production.

TABLE LXX

A Measure of Productivity of Capital : the Q/K Ratio
(1958 - 1966)

	20-22	23	24	25-26	27-28	29-32
1958	1,989930	1,758620	24,708477	9,326351	1,373604	0,951681
1959	1,925443	1,833325	21,927354	9,217526	1,448671	1,051450
1960	1,739421	1,926233	19,729132	9,106396	1,532156	1,082011
1961	1,808215	2,003831	17,917791	9,000721	1,626119	1,161613
1962	1,754662	2,101402	16,410181	8,895547	1,732194	1,253780
1963	1,704472	2,209314	15,141540	8,795730	1,853076	1,361921
1964	1,656931	2,328220	14,050781	8,697502	1,992180	1,490600
1965	1,612012	2,461331	13,109093	8,599745	2,153864	1,646102
1966	1,569400	2,609790	12,285690	8,506279	2,344201	1,837870

	33	34	35-37	38	39
1958	1,415835	1,436781	2,880079	2,719606	0,832885
1959	1,374265	1,410863	3,019762	2,169791	0,886974
1960	1,335500	1,378931	3,174337	1,955897	0,948467
1961	1,298591	1,351563	3,345408	1,780813	1,019290
1962	1,263721	1,325488	3,535860	1,634228	1,101521
1963	1,230690	1,300259	3,749131	1,510074	1,239336
1964	1,199441	1,275806	3,989133	1,403615	1,347715
1965	1,169640	1,251942	4,264692	1,310955	1,453045
1966	1,141252	1,229801	4,579379	1,229984	1,628571

TABLE

A Measure of Productivity of Labour : the Q/L Ratio
(1958 - 1966)

	20-22	23	24	25-26	27-28	29-32
1958	32 588	45 457	32 901	17 937	38 703	38 696
1959	33 676	45 794	30 295	17 345	39 229	50 392
1960	33 784	52 781	32 618	18 238	40 202	58 810
1961	36 856	52 767	34 661	19 952	40 141	51 508
1962	39 111	55 840	33 530	19 918	40 964	54 550
1963	38 612	52 762	33 052	24 761	46 850	61 107
1964	41 806	57 270	30 136	27 852	49 362	63 050
1965	46 998	66 410	33 520	29 835	51 636	74 154
1966	50 997	65 236	35 242	31 247	58 338	77 662

	33	34	35-37	38	39
1958	38 356	102 617	31 929	13 920	67 559
1959	34 408	116 692	32 401	17 475	64 050
1960	34 010	158 979	37 211	18 159	62 327
1961	36 827	164 988	40 270	22 755	70 603
1962	38 396	171 441	39 133	24 334	67 364
1963	41 703	146 639	39 036	28 213	63 517
1964	46 614	168 460	44 139	30 039	65 321
1965	55 024	139 039	46 901	31 525	64 149
1966	54 940	232 056	52 624	32 903	65 759

D. Derivation of the Residual Factor

The derivation of the function in the form $\frac{\dot{Q/L}}{Q/L} = \frac{\dot{A}}{A} + w_K \frac{\dot{K/L}}{K/L}$ was seen in Chapter Ten, Para. A., above. The next step is to relate the derivatives to discrete proportionate rates of change of the total output per capita and capital per capita variable, by approximating them to first differences in annual data, so that there is a number which can be arrived at for each t, which can be identified with $\frac{\dot{A}}{A}$. By this procedure a measure of disembodied technical change for each t can legitimately be found.

Substituting therefore discrete rates of change in place of derivatives we obtain (ignoring the error term)

$$\frac{(Q/L)_t - (Q/L)_{t-1}}{(Q/L)_{t-1}} = \frac{A_t - A_{t-1}}{A_{t-1}} + A \frac{f}{(K/L)} \frac{(K/L)_t - (K/L)_{t-1}}{(Q/L)_{t-1}} .$$

If we assume (see p. 192 above) that

$$A \frac{f}{(K/L)} = \frac{(Q/L)}{(K/L)}$$

then

$$\frac{(Q/L)}{(K/L)} \frac{K/L}{Q/L} = w_K = 1 - w_L$$

and therefore substituting we have

$$\frac{(Q/L)_t - (Q/L)_{t-1}}{(Q/L)_{t-1}} = \frac{A_t - A_{t-1}}{A_{t-1}} + w_K \frac{(K/L)_t - (K/L)_{t-1}}{(K/L)_{t-1}}$$

and from this rearranging we have

$$\frac{A_t - A_{t-1}}{A_{t-1}} = \frac{(Q/L)_t - (Q/L)_{t-1}}{(Q/L)_{t-1}} - w_K \frac{(K/L)_t - (K/L)_{t-1}}{(K/L)_{t-1}} .$$

The method is used by Solow,[1] assuming again that w_K can be measured by the share of profits.

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(1) Robert M. Solow: "Technical Change and the Aggregate Production Function", Review of Economics and Statistics, Vol. XXXIX, 1957.

This application of discrete changes instead of time derivatives in the final form of the production function in calculating the residual factor (i.e. the approximation of derivatives by weighted first differences in the data) brings about important features in the function as a departure from the specification of the parameters. Obviously the measure of increases in the factor-input and weighted-output share is only correct for infinitesimal changes: with finite changes an overestimate is introduced into the argument. In viewing how the change in A_t proceeds through time we observe that an assumption that it proceeds at a constant proportional rate n (so that $A_t = A_o e^{nt}$), is more or less at variance with the empirical evidence and the flow of time in the measurement of variables K and L.

Under those qualifications a residual measure of $\Delta A/A$ can then be derived (with the multiplicative w_K giving the function its geometric properties), after the other terms are computed empirically. In determining the factors of productivity change our A factor is viewed against a rise in the K/L ratio (capital deepening). Changes in A correspond to a shift in the production function, where if $Q/L = f(K/L)$ an increase in capital intensity refers to a movement along the isoquant. With a shifting function one is given one only of alternative factor combinations at any time, and only this point on the function shifting due to technology is observable, making it difficult to distinguish between the effects of technical progress and those of capital intensity.(1)

The "catch-all" residual A is set against a framework implied in our asssumptions, that technical progress leads "inter alia" to the production of new types of goods, but does not seem

(1) Benton F. Massel: "A Disaggregated View of Technical Change", Journal of Political Economy, 69, 1961, pp. 547-48.

to depend on new equipment.(1) It affects of course equally all capital and labour in existence. The shift in the function shown by the constant term A , has been presented to be smaller in developing economies which make less effective use of the capital and labour inputs because of unfavourable physical and institutional conditions and lack of skills.(2) A gradual improvement in the capacity to absorb advanced technologies is generally expected to accelerate this shift of the function upwards. To the effect that in a growing economy the Cobb-Douglas constant expresses an absolute contribution of progress, which once achieved could be expected to increase in proportion to increases of the output-base itself, the observation is correct.(3) One should note, nevertheless, that capital formation in the Cobb-Douglas framework will produce higher progress-generated output-increments than investment-generated output-increments in terms of social yield.

In Table LXXI the residual factor is computed by sector of the manufacturing industry. To arrive from what is computed in the form DA_t/A_t to an index of A_t values, I set an arbitrary value of A = 1.000000 in the initial period and since

$$A\,(t + 1.000000) = A_t\,(1 + DA_t/A_t)$$

we obtain the index of annual changes in A_t , setting $A_o = 1.000000$. Introducing discrete changes therefore involves that $A_t = A_o(1 + n)^t$ and I use forward differences as in the Solow original.

We note the near absense of a cumulated residual factor change in the case of clothing-footwear industries (ISIC 24) and the wide fluctuations in the basic metal industries (34). The higher levels of "technology" index are observed quite predictably in the chemicals and allied products (29-32) . The metal products - machinery group of industries (35-37) follows. In the case of branches 24 and 34 the

(1) William Fellner: "Trends in the Activities Generating Technological Progress", A.E.R., Papers and Proceedings, 29, Dec. 1969, p. 12.
(2) H.A. Eltis: "Capital Accumulation and the Rate of Industrialisation of Developing Countries", The Economic Record, June, 1970, p. 156.
(3) William Fellner: Op.cit., 1969, Appendix A, p. 23.

TABLE LXXI

Derivation of the Residual Factor: DA/A and A Indexed

YEAR	20-22 Food Drink Tobacco DA/A	20-22 A Indexed	23 Textiles DA/A	23 A Indexed	24 Clothing Footwear DA/A	24 A Indexed	25-26 Wood Cork Furniture DA/A	25-26 A Indexed
1958		1.000000		1.000000		1.000000		1.000000
1959	-0.014428	0.985572	0.055915	1.055915	0.015369	1.015369	0.035721	1.035721
1960	0.022074	1.007328	0.016765	1.073617	-0.079461	0.934687	-0.031227	1.003379
1961	-0.018282	0.988912	0.117524	1.199793	0.073919	1.003778	0.031385	1.034870
1962	0.081020	1.069034	0.013289	1.215737	0.031528	1.035418	0.064815	1.101945
1963	0.045201	1.117355	0.054644	1.282170	-0.039311	0.994715	-0.003148	1.098476
1964	-0.015051	1.100539	-0.019499	1.257169	-0.024791	0.969923	0.222954	1.343386
1965	0.069691	1.177236	0.077078	1.354069	-0.090966	0.881693	0.115171	1.498105
1966	0.097945	1.292540	0.086062	1.470603	0.091779	0.962632	0.064456	1.594667
	0.063806	1.375012	0.003887	1.476319	0.030247	0.991749	0.041743	1.661233

YEAR	27-28 Paper Printing DA/A	27-28 A Indexed	29-32 Leather-Rubber Plastics Chemicals-Petrol DA/A	29-32 A Indexed	33 Non-metallic Minerals DA/A	33 A Indexed	34 Basic Metal Industries DA/A	34 A Indexed
1958		1.000000		1.000000		1.000000		
1959	0.072019	1.072019	0.124143	1.124143	-0.015582	0.954418		
1960	0.025260	1.106481	0.214732	1.355532	-0.086464	0.871958		
1961	0.034808	1.144995	0.117747	1.526319	-0.008219	0.864693		
1962	0.012286	1.159062	-0.072155	1.416187	0.064317	0.920308	0.027417	1.000000
1963	0.015424	1.176939	0.064665	1.507765	0.030332	0.948223	-0.108670	1.027417
1964	0.129859	1.329775	0.113096	1.678287	0.067312	1.012050	0.119801	0.915768
1965	0.056054	1.404314	0.042441	1.749515	0.092357	1.105520	-0.149270	1.025478
1966	0.050516	1.475254	0.168576	2.044441	0.141896	1.262389	0.609019	0.872405
	0.077543	1.589650	0.039334	2.124857	-0.006352	1.254370		1.403716

YEAR	35-37 Metal Products Machinery Electr.Equipm. DA/A	35-37 A Indexed	38 Transport Equipment DA/A	38 A Indexed	39 Miscellaneous Industries DA/A	39 A Indexed
1958		1.000000				
1959	0.169994	1.169994				
1960	0.021785	1.195482				
1961	0.128832	1.349498				
1962	0.077207	1.453589		1.000000		1.000000
1963	-0.015927	1.430536	0.025358	1.025358	0.013478	1.013478
1964	0.014836	1.451759	0.073261	1.100477	0.051239	1.065408
1965	0.114004	1.617265	0.016904	1.119079	0.056479	1.125591
1966	0.064068	1.720880	0.009246	1.129426	0.023243	1.151743
	0.110989	1.911879	0.003333	1.133190	0.053123	1.212927

drop in the residual factor is related to the smooth but extremely steep increase in the K/L ratio over the period, far outstripping any such increases in other branches. In any period of quick recovery the index of capital tends to overstate the actual capital input and the index of technology is understated either levelling off or actually declining. Alternatively one would suspect a statistical artifact, either due to the poor quality of unadjusted inputs,[1] or perhaps because the period under consideration is just enough for a medium-term observation, when technological change is of necessity a long-term phenomenon. One is little apprehensive of such "post hoc" splitting up of periods, in view of the long-term secular movements levelling around mean values in the long-run. On the other hand one can not help thinking in terms of functions expressing symptoms of a stage of capital saturation in the operational loci on the true asymptotes, with a gross or even net marginal product over the medium-range period under consideration dropping around the range of the marginal rate of depreciation.

The analysis of best practice techniques in production indicates a flow of new knowledge that leads to continuous change in the production function. This change together with the changing relative factor prices determine the appropriate best practice techniques. The extent of the technical advance from one period to the next can be isolated in terms of the relative change in total unit costs when the techniques of production in each period are those which would minimise unit costs when factor prices are constant.[2] One such measure has been developed by Salter. In a continuous process the proportional rate of advance at any point of time is derived by comparing techniques appropriate to the same factor prices so that

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(1) We notice that there is no a priori reason to expect the residual necessarily to drop with all adjustments of factors for quality and service changes. Additionally productivity may increase where industry utilizes more intensively a component sector, enjoying a comparative advantage. Such a change in the composition of output may not be measured as technical progress and the residual as an aggregate measure may not reflect this kind of change. On the latter see Kenneth F. Wallis: Op.cit., 1973, p. 52.

(2) W.E.G. Salter: Op.cit., 1966, p. 30.

TABLE LXXII

Unit Cost Savings in Production Due to Technical Change

	20-22 Food Drink Tobacco	23 Textiles	24 Clothing Footwear	25-26 Wood Cork Furniture	27-28 Paper Printing	29-32 Leather-Rubber Plastics Chemicals-Petrol
1958						
1959	-0.021522	-0.016022	+0.086036	+0.032457	-0.024594	-0.178959
1960	+0.015324	-0.108755	-0.069912	-0.039524	-0.033126	-0.086840
1961	-0.074535	-0.013840	-0.055297	-0.055358	-0.017871	+0.065348
1962	-0.040701	-0.051827	+0.044739	+0.005009	-0.027947	-0.061127
1963	+0.015622	+0.016059	+0.023411	-0.166061	-0.119370	-0.097410
1964	-0.061717	-0.067019	+0.093718	-0.101423	-0.053766	-0.043693
1965	-0.095095	-0.114032	-0.073899	-0.060947	-0.179993	-0.136923
1966	-0.060585	-0.002829	-0.036924	-0.040621	-0.110957	-0.051849

	33 Non-metallic Minerals	34 Basic Metal Industries	35-37 Metal Prod. Machinery Electr.Eq.	38 Transport Equipment	39 Miscellaneous Industries
1958					
1959	+0.285435		-0.019729		
1960	+0.027164		-0.111784		
1961	+0.018855		-0.070869		
1962	-0.022722		+0.170983		
1963	-0.024130	+0.270277	-0.004417	-0.075761	-0.023248
1964	-0.067988	-0.218690	-0.099006	-0.015105	-0.060281
1965	-0.088536	+0.193973	-0.060150	-0.008623	-0.030360
1966	-0.009043	-0.411257	-0.098882	-0.007039	-0.061534

Note : All entries indicate the fall in unit costs of production with constant factor prices, i.e. if nothing changed except technical knowledge. All entries equal $(-1 + T)$, where T is derived in Laspayres index-number-form measures from the formula (with inputs per unit of output)

$$T = \frac{\bar{L}_{t+1} w_t + \bar{K}_{t+1} p_t}{\bar{L}_t w_t + \bar{K}_t p_t}$$

Source : W.E.G. Salter: Productivity and Technical Change, Cambridge University Press, 1966, pp. 30-31.

$$T_r = \frac{\frac{d\bar{L}}{dt} w + \frac{d\bar{K}}{dt} p}{\bar{L}w + \bar{K}p}$$

or if we frame the measure in terms of marginal products rather than unit costs

$$T_r = \frac{\frac{dL}{dt}\frac{\partial Q}{\partial N} + \frac{K}{dt}\frac{\partial Q}{\partial I}}{L\frac{\partial Q}{\partial N} + K\frac{\partial Q}{\partial I}}$$

where N stands for man-hours per annum and I for initial real investment at constant prices. Following the first formulation, assuming that technical advance came in a series of discrete jumps and employing period t prices as a basis for factor costs (Laspeyres Index) we have in terms of factor inputs per unit of output

$$T = \frac{\bar{L}_{t+1} w_t + \bar{K}_{t+1} p_t}{\bar{L}_t w_t + \bar{K}_t p_t}$$

What the measure indicates is how much unit costs of production would fall if nothing changed except technical knowledge, that is if factor prices are constant. The results are given in Table LXXII It is interesting to note that the results are a reflection of the pattern of residual entries in Table LXXI . Note the cost increases in branches 24 and 34 in half of the years and also the change of branch 33 after the initial period to a cost-saving structure of technological change. A more detailed analysis of the implications of those findings by branch of the industry is made in a later part of this chapter.

As can be seen from Table LXXII the optimal technology requires lower costs of production per unit of value of output, the difference in costs being the "rent of technical superiority".(1) In the long-run technical progress is a major determinant of growth, because by reducing costs it helps an expansion in investible surplus and by

(1) Charles P. Kindleberger: American Business Abroad: Six Lectures on Direct Investment. Yale Univ. Press, 1969, p. 18.

allowing a reduction in prices brings about an increase in real demand for goods and services, stimulating both the supply and the demand for output. The costs are lowered in a great many number of ways, by reducing the input-output ratio, introducing new methods, making use of cheaper inputs, or improving the quality of the produot for example. It would be very interesting to see whether the available evidence in our case would lead us to believe that there exists a connection between the inflow of foreign capital and improvements in technology in the Greek manufacturing industry. The evidence is examined first in the light of our estimates of the residual factor in the following paragraph **E**. Then the contribution of foreign firms and the overall technology requirements of each sector of the industry in a wider context are seen in some detail in chapter eleven.

TABLE LXXIII

Degree of Mechanization :
Share of Mechanical Equipment
on Total Net Capital Stock

	20-22 Food Drink Tobacco	23 Textiles	24 Clothing Footwear	25-26 Wood Cork Furniture	27-28 Paper Printing	29-32 Leather-Rubber Plastics Chemicals-Petrol
1953	.4569	.7003	.7304	.5544	.7045	.7286
1954	.4642	.7186	.7367	.5693	.7077	.7331
1955	.4887	.7263	.7519	.5750	.7138	.7369
1956	.5101	.7374	.7534	.5870	.7219	.7439
1957	.4307	.7512	.7600	.6227	.7312	.7495
1958	.4657	.7662	.7454	.6483	.7451	.7136
1959	.4862	.7860	.7324	.6590	.7580	.7581
1960	.5024	.8093	.7310	.6853	.7738	.7657
1961	.5631	.8402	.7021	.6616	.7997	.7771
1962	.5496	.8616	.7088	.6589	.8326	.7715
1963	.5530	.8195	.7134	.6528	.8538	.7826
1964	.5522	.8958	.7034	.6754	.8709	.7899
1965	.5428	.9155	.7097	.6561	.8540	.7914
1966	.5396	.9355	.7186	.6460	.8238	.7945

	33 Non-metallic Minerals	34 Basic Metal Industries	35-37 Metal Products Machinery Elect. Equip.	38 Transport Equipment	39 Miscellaneous Industries
1953	.7304	.7000	.5804	.3714	.5586
1954	.7480	.7284	.5878	.3179	.5914
1955	.7689	.7357	.5937	.3305	.6141
1956	.7852	.6915	.6018	.3515	.6399
1957	.7765	.7455	.6267	.3619	.6910
1958	.7840	.7467	.6592	.3611	.7097
1959	.7766	.7572	.6656	.3822	.7331
1960	.7823	.7682	.6632	.4010	.7620
1961	.7799	.7988	.6682	.3978	.7879
1962	.7642	.8713	.6755	.3867	.8397
1963	.7478	.8772	.6732	.3720	.8493
1964	.7407	.8765	.6818	.4174	.8947
1965	.7365	.9205	.6844	.4236	.9337
1966	.7412	.8307	.6728	.4163	.9871

Source : Derived from capital stock breakdown and estimates in Chapter Nine, Para. B., II, Table LIII, p. 164 ff. above.

TABLE LXXIV

Measures of Net/Gross Capital Stock by Sector of the Industry

	20-22 Food Drink Tobacco		23 Textiles		24 Clothing Footwear		25-26 Wood Cork Furniture	
	Net/Gross Capital Stock	Net/Gross Foreign Capital Stock	Net/Gross Capital Stock	Net/Gross Foreign Capital Stock	Net/Gross Capital Stock	Net/Gross Foreign Capital Stock	Net/Gross Capital Stock	Net/Gross Foreign Capital Stock
1953	0.7935		0.8280		0.8679		0.8667	
1954	0.7738		0.7724		0.8448		0.8302	
1955	0.7729		0.7348	1.0000	0.8458		0.8000	
1956	0.7560	1.0000	0.6960	0.9700	0.8169		0.7532	
1957	0.8037	0.9851	0.6580	0.9134	0.7792		0.7710	
1958	0.7976	0.9672	0.6274	0.8672	0.8244		0.7579	1.0000
1959	0.7736	0.9471	0.5911	0.8171	0.8225	1.0000	0.7370	0.9743
1960	0.7463	0.9269	0.5581	0.7696	0.8354	0.9696	0.7152	0.9303
1961	0.7546	0.8902	0.5302	0.7260	0.8157	0.9120	0.7044	0.8767
1962	0.7417	0.9061	0.5062	0.6857	0.7792	0.9706	0.6820	0.8312
1963	0.7305	0.9113	0.4799	0.9848	0.7594	0.9225	0.6831	0.8109
1964	0.7156	0.8882	0.5362	0.9764	0.7630	0.9200	0.7278	0.8527
1965	0.7243	0.8774	0.5849	0.9314	0.7554	0.8771	0.7479	0.8113
1966	0.7277	0.8598	0.5950	0.8934	0.7384	0.8553	0.7409	0.7866

	27-28 Paper Printing		29-32 Leather-Rubber Plastics Chemicals-Petrol		33 Non-metallic Minerals		34 Basic Metal Industries	
1953	0.8198		0.8552		0.8687		0.9032	
1954	0.7793	1.0000	0.8234		0.8462		0.9204	
1955	0.7441	0.9703	0.7843	1.0000	0.8457		0.8994	
1956	0.7096	0.9471	0.7535	0.9942	0.8378		0.9362	
1957	0.6807	0.9224	0.7316	0.9651	0.8033		0.8174	
1958	0.6484	0.8825	0.6949	0.9155	0.7604	1.0000	0.7880	
1959	0.6111	0.8461	0.6903	0.9467	0.7349	0.9688	0.7530	
1960	0.5867	0.8456	0.6571	0.9487	0.6986	0.9478	0.7198	
1961	0.5868	0.8356	0.6154	0.9284	0.6643	0.9286	0.7337	1.0000
1962	0.5617	0.7913	0.5963	0.8998	0.6668	0.8900	0.8027	0.9870
1963	0.6143	0.7498	0.5882	0.9188	0.6789	0.8819	0.7748	0.9541
1964	0.6148	0.7794	0.5674	0.8981	0.6897	0.8955	0.7292	0.8925
1965	0.6476	0.7559	0.6813	0.9551	0.6916	0.8841	0.8511	0.9730
1966	0.6886	0.7197	0.6728	0.9122	0.6883	0.9403	0.8157	0.9176

TABLE LXXIV
(Continued)

	35-37 Metal Products Machinery Electr. Equipment		38 Transport Equipment		39 Miscellaneous Industries	
	Net/Gross Capital Stock	Net/Gross Foreign Capital Stock	Net/Gross Capital Stock	Net/Gross Foreign Capital Stock	Net/Gross Capital Stock	Net/Gross Foreign Capital Stock
1953	0.8188		0.9074		0.8473	
1954	0.8003		0.8889		0.8169	
1955	0.7704	1.0000	0.8551		0.7881	
1956	0.7407	0.9777	0.8354		0.7604	
1957	0.7248	0.9896	0.8400	1.0000	0.7469	
1958	0.7096	0.9654	0.9504	0.9965	0.6935	
1959	0.6805	0.9329	0.9295	0.9696	0.6503	
1960	0.6492	0.9082	0.9291	0.9520	0.6054	1.0000
1961	0.6262	0.8364	0.9008	0.9136	0.5501	0.9888
1962	0.6037	0.8038	0.8789	0.8776	0.4934	0.9584
1963	0.6181	0.7855	0.8513	0.8608	0.4653	0.9509
1964	0.6320	0.7740	0.8494	0.8569	0.4412	0.9112
1965	0.6482	0.7888	0.8367	0.8484	0.4485	0.8768
1966	0.6895	0.7810	0.8177	0.8152	0.4300	0.8288

Source : Derived from estimates on investment in Chapter Nine B and estimates of depreciated net capital stock in Chapter Nine C. Also from estimates in Chapter Four C, and Table XV, with appropriate assumptions.

E. Foreign Investment and Technological Change

The connection between technical progress and the inflow of foreign capital in a country is a topic that has often been discussed in principle, but one which remains difficult to test in a more concrete form. The difficulties are not merely related to matters of statistical documentation, although the obstacles and deficiencies there are quite considerable. It is rather that one is aware that the residual factor is not dependent on investment or capital accumulation alone for a change in its magnitude.(1) And of course we are still unable to specify with a great degree of certainty the nature and the magnitude of the inputs which would bring about increments in the residual factor. Some empirical linkage nevertheless is not explicitly impossible. Earlier work has sometimes approached critically this problem. E. Domar has tried to define a relationship between the residual factor and specific capital inputs in the early sixties. It is interesting now, on a comparative basis, to see to what extent the path of the residual is explained by variations in the inflow of foreign capital in the Greek economy. The link between disembodied technical change and the inflow of foreign capital in a developing economy is challenging as a general proposition, although its validity rests on crucial assumptions about the rate of diffusion of technology in the economy, and particularly so between the foreign- and the locally-financed parts of it.

In a broad sense the "disembodiment effects" of foreign investment can be summarised as follows: This type of investment usually comes as a "package deal"; it brings about a change in efficiency, new social habits, new institutions; in one word it is important as a catalytic agent. It increases what Baumol calls the "index of expansion ratio", i.e. the level of productivity and effective use

(1) Let alone that the residual itself reflects the effects of left-out variables, returns to scale (non-constant i.e. increasing or decreasing), non-unitary elasticity of substitution, non-normally distributed error terms, factor shares not representing production elasticities, etc., so that it can not be an unqualified index of technology proper.

of the nation's resources.[1] Managerial and marketing skills and abilities (for production as well as for maintenance and sales), entrepreneurship to offset limited local experience, "know-how" and other skills for installation of equipment and construction of plants, organisation, training of Greek personnel and development of new processes and techniques are its general characteristics.[2] In fact various contractual arrangements for the transfer of "know-how", such as technical agreements, management contracts, construction and engineering contracts, help to uncover new physical resources or activate latent human resources and to set in motion a chain reaction resulting in a process of economic expansion could all be lumped together as disembodiment effects of foreign investment.[3] Licence agreements providing access to new methods and reducing the unit costs of the expenditure, and the establishment of a new industrial "milieu" with new social overhead facilities also help to assimilate an advanced technology, with external economies to scale rising in the economy as the "know-how" gets outside the foreign firms.[4]

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(1) William J. Baumol: Business Behaviour, Value and Growth, Harcourt, Brace and World Inc., New York, 1967, p. 133.
J.J. Dernburg: "Comment on the Pannel on Corporate International Investment", A.E.R., Supplement, 44, 1954, p. 61.
U.S. Department of Commerce: Business Investments in Foreign Countries, Washington D.C., 1960, pp. 44-45.
Angus Maddison: Foreign Skills and Technical Assistance in Economic Development, OECD, Paris, 1965, pp. 32-36.
Brinley Thomas: "International Factor Movements and Unequal Rates of Growth", The Manchester School, January, 1961, p. 16 ff.

(2) Anthony Koo: "A Short-Run Measure of the Relative Economic Contributions of Direct Foreign Investment", Review of Economics and Statistics, XLIII, August, 1961, pp. 269-70.
E. Stanley: The Future of Underdeveloped Countries, Harper and Row, New York, 1954, p. 261 ff.

(3) Philip Z. Kirpich: "Foreign Experts - Their Advantages and Limitations", Finance and Development, Vol. VI, No. 1, March, 1967, p. 44 ff.
U.N.: The United Nations Development Decade: Proposals for Action, Department of Economic and Social Affairs, New York, 1962, pp. 91-2.

(4) Tibor Scitovsky: "Three Concepts of External Economies", Journal of Political Economy, April, 1954.

For any meaningful evaluation of the foreign investment impact a measure of foreign capital stock is necessary.(1) As described in an earlier chapter we can only develop such a measure on the basis of specific assumptions regarding the ownership and the composition of the stock. I accept that the foreign stock building up through foreign investment is held in the ownership of the same or other foreign investors and that no transfers or takeovers have substituted Greek ownership for the foreign. The foreign investment legislation would discourage such transfers of ownership unless another foreign interest were to take over. In the case of portfolio participation the foreign share is counted as part of the foreign stock. Greeks from abroad are granted by law the privileges of the foreign investors, so that their investments are also included in the foreign-owned sector. As for the composition of the foreign investments and the breakdown of the foreign-owned stock in machinery, equipment and buildings there exists no information of any kind, so that I assume that the breakdown for the entire industry (Greek- and foreign-owned) applies to the foreign-owned part of it. Whether the average foreign concern is more mechanised than a comparable Greek concern is something that can not be verified. The only provision I made was to apply to the foreign investments the breakdown applying to the large-scale (over 10 employees) rather than the total industry rates. An entire set of estimates for the foreign sector were then calculated and from the inflow estimates I arrived to a "foreign-onwned capital stock" by sector, using such depreciation rates as applied to the corresponding branches of the industry as a whole. One could of course question the wisdom of applying the same depreciation rates in the case of local investors and foreign investors alike in view of the considerable concessions granted to the latter by L.D. 2687/1953 and the subsequent legislation. But then it could be argued that we are interested in economic and not financial depreciation and additionally that Greek

(1) Notice the importance some authors attribute to non-proprietary managerial technology against the primacy-of-capital position of others. Cf. John H. Dunning and M. Steuer: "The Effects of US Direct Investment on British Technology", J.H.Dunning, Ed., Studies in International Investment, Allen and Unwin, London, 1970, p. 336.

TABLE LXXV

The Foreign Capital Share of the Industry

	20-22 Food Drink Tobacco	23 Textiles	24 Clothing Footwear	25-26 Wood Cork Furniture	27-28 Paper Printing	29-32 Leather-Rubber Plastics Chemicals-Petrol
1953	-	-	-	-	-	-
1954	-	-	-	-	.0264	-
1955	-	.0003	-	-	.0492	.0007
1956	.0020	.0006	-	-	.0759	.0079
1957	.0063	.0005	-	-	.0984	.0131
1958	.0079	.0005	-	.0593	.1023	.0133
1959	.0098	.0005	.0204	.1253	.1084	.0305
1960	.0117	.0005	.0266	.1254	.1379	.0632
1961	.0093	.0004	.0213	.1122	.1505	.0949
1962	.0135	.0004	.1087	.1075	.1452	.1098
1963	.0188	.0138	.1082	.1089	.1147	.2031
1964	.0206	.0392	.1472	.1300	.1540	.2580
1965	.0231	.0417	.1397	.1078	.1422	.5010
1966	.0243	.0427	.1514	.1084	.1140	.5422

	33 Non-metallic Minerals	34 Basic Metal Industries	35-37 Metal Prod. Machinery Electr.Eq.	38 Transport Equipment	39 Miscellaneous Industries
1953	-	-	-	-	-
1954	-	-	-	-	-
1955	-	-	.0011	-	-
1956	-	-	.0026	-	-
1957	-	-	.0193	.2616	-
1958	.0073	-	.0338	.6975	-
1959	.0126	-	.0431	.7473	-
1960	.0202	-	.0535	.6617	.0008
1961	.0290	.0416	.0750	.5792	.0050
1962	.0271	.0552	.0749	.4911	.0085
1963	.0311	.1682	.0764	.5129	.0182
1964	.0418	.1614	.0748	.4903	.0217
1965	.0485	.4397	.0855	.4443	.0245
1966	.1252	.4480	.0843	.3915	.0254

Note : Estimates derived as the ratio of the Foreign-Owned Net Capital Stock to Total Net Capital Stock by branch of the Industry.
For method of estimation see text.

firms are quite regularly granted high tax inducements for productive enterprises,[1] so that the difference in concessions is not as large as it might seem to be.

It is only one step further then to obtain the ratio of the foreign-owned net capital stock to total net capital stock by branch of the industry. This would be a measure of the share of foreign capital in total industry, or, alternatively, a measure of the foreign control in the Greek manufacturing industry by sector. The estimates are given in Table LXXV .

Comparing Table LXXI to Table LXXV we observe that only branch 29-32 shows a high level of participation of foreign capital with a high index of residual factor. Branch 34 has an erratic index of residual factor, branch 38 a very slow-changing one, branch 24 an actually declining index and branch 33 an increase in the index in the years 1964 and 1965 before any considerable foreign investment increase took place in 1966. On the other hand branch 35-37 has a very rapidly increasing index of residual factor despite the extremely low level of foreign capital participation and branch 27-28 another steeply increasing residual's index with a foreign participation index actually declining after 1961. The obvious conclusion to be drawn is that the level of foreign capital participation has little effect on the level or direction of the residual factor, so that if the latter is interpreted as a technology index, the foreign firms on this evidence did not bring about a great deal of this (with the exception of branch 29-32) nor did they seem to participate as a matter of deliberate policy in branches where technological change as expressed by the residual was actually taking place (e.g. in branch 35-37) resulting in high unit cost savings in production (see Table LXXII). Even in branch

(1) Center of Planning and Economic Research: Effectiveness of Tax Inducements in Greece and Proposals for Amendments, (in Greek), Athens, 1967, p. 140.
John N. Koulis: Tax Inducements with Particular Reference to Greece, (in Greek), Athens, 1957.

29-32 high residual factor entries are observed before foreign investment became a substantial share of all investment outlays.

But of course the question is whether technical progress as a long-term secular movement is best expressed by such movements as the annual fluctuations in the residual factor, or whether such progress is essentially a long-term phenomenon. In other words there is a question as to whether such short-term shifts in the function as expressed by the index of residuals are meaningful for economic analysis. And the answer must surely be that they are useful indicators whose analytical power would be that much larger if adequate statistical information would allow quality adjustment of the inputs, if a longer period of observations would allow the fund of technological knowledge to operate over a long-term production process, and if some of the restrictive assumptions concerning the scale parameter, the elasticity of substitution, or the neutrality conditions could be eased.

As it is the question of foreign capital (and equipment) in connection to changes in technology usually centres on a primacy-of capital position which is heavily dependent on the importance of the external effects of investment.(1) The role of foreign capital in growth policies of developing countries, whether in the form of foreign aid, loans, or investment has extensively been discussed in theory.(2) The increased efficiency of productive resources is the end result of applications of knowledge embodied in industrial processes. Technological innovations from the part of foreign firms and their diffusion in the economy may be of fundamental importance to economic growth, and the economic benefits of change are often evolved under circumstances of high productivity. Yet there exist nontransferable components of advanced technology, which are uneconomic and technically retrogressive when applied to small-scale,

(1) Sayre P. Schatz: "The Role of Capital Accumulation in Economic Development", Journal of Development Studies, October 1968, p. 40.

(2) A.G. Ford: "Economic Growth: A Theoretical Outline", Planning and Growth in Rich and Poor Countries, W. Birmingham and A.G. Ford, Eds., Allen and Unwin, London, 1966, pp. 43, 45.

low-productivity economies,[1] so that the assimilation of the components of advanced technology which largely characterize the larger foreign firms(rather than smaller establishments)[2] is slow or difficult and the feasibility of transference or adaptation of new complex techniques into the operations of smaller Greek firms should be viewed with reference to particular evidence on a disaggregated level rather than in terms of broad groups of industries.[3] Whilst it is true that foreign investors often initiate improvements in the production function of firms within an industry both in terms of capital deepening and capital widening and therefore are important in terms of productivity improvements, it is obviously entirely possible that the relative technological gap between the foreign enterprises and the others would actually work against a substantial overall improvement. To that effect a detailed analysis of the components of advanced production technology is made in chapter eleven and the evidence is related to the foreign concerns that operate in competition with the Greek firms. But first the effects that the establishment of such foreign concerns had on the labour market are seen in the following paragraph.

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(1) Robert Solo: "The Capacity to Assimilate an Advanced Technology", A.E.R., Papers and Proceedings, May, 1966, p. 96.
Richard E. Caves: "International Corporations: The Industrial Economics of Foreign Investment", Economica, February 1971, p. 4.

(2) This is suggested by the occurance of R.& D. mainly among the largest firms in most industrialised countries (Cf. O.E.C.D.: The Overall Level and Structure of R.& D. Efforts in O.E.C.D. Member Countries, Paris,
It is fair to mention that evidence exists for a few countries where most of the technology imports were made by small- or medium-size firms, rather than the larger ones (Cf. National Council of Applied Economic Research: Foreign Technology and Investment, A Study of their Role in India's Industrialization, New Delhi, June, 1971, pp. 14, 17).
This phenomenon , nevertheless, occurs most probably where large firms employ technical staff of their own, which supplies a good deal of their requirements of technology. Such research units did not exist even in the largest Greek firms in the period before 1966.
More on this particular issue in chapter

F._ Foreign Investment_and_the_Labour Input

One important feature of the economic structure in Greece was that the primary production sector was still lagging acutely at the end of the period, particularly in terms of excessive fragmentation of the average holdings, insignificant share of livestock (large animals were about one-twentieth of the animal population in Greece as compared with one-half in France and one-third in Italy), poultry and fisheries and of the preeminence of low-export-potential wheat and cereals in production in the place of labour intensive crops such as fruits, vegetables and cotton yielding several times as much income per man. Only 37,000 square kilometers out of a total area of 130,000 were cultivated at the end of the period. With the exception of the major project of land reclamation by drying-up the Amvrakikos gulf in the north-western coast, no further land is available other than small areas in the valeys of northern and western Greece requiring flood control and irrigation works; formidable mountain ranges cover two-thirds of the territory. And yet agriculture absorbed half the active population in the land. Considerable difficulties arose predictably in the process of integration of the Greek economy into the European Economic Community.

Labour-intensive techniques of production in order to achieve a low capital/output ratio and therefore cope with the chronic problem of capital shortage in the manufacturing industry as well as in other sectors would fit in efficiently with the Greek factor endowments. The concept of large foreign-financed concerns in the manufacturing industry absorbing surplus idle labour force from the chronically underemployed agricultural sector has therefore been in the minds of a number of policy-makers. Greece, with idle resources and factors in the form of unemployment in the agricultural sector, could obviously try to make use of those resources to help the formation of

productive capital. Ideally, the argument went, with a large amount of capital inflow from abroad and with mobile labour force, labour seeking jobs in the foreign-financed sector would be absorbed at the higher wage rate in the latter, as stipulated by the "classical" approach of the theory of development of a dual economy[1]: labour would be available in unlimited numbers at a fixed real-wage rate. With surplus labour in the subsistence sector, the diminution of labour proportion there would simply increase its marginal product, and hence raise wages. Almost any industry absorbing surplus rural population would produce a net gain in real national income. The draining of suplus labour from rural sectors was generally expected in this case to have little or no effect on the output of those sectors. Marginal productivity was generally considered extremely small (zero or at any rate less than the real-wage rate) and the subsistence income was below the surplus labour's marginal productivity in industry, so that where the marginal productivity of the agricultural surplus labour was zero, the transfer of labour could be expected to take place without loss in the agricultural output; where it was positive but less than the real-wage rate there would only be small sacrifices in agricultural output.

Things in fact worked out quite differently in Greece and this could be explained on a number of grounds. In the first instance in a country aspiring for rising employment with rising real per capita income the maximum labour absorption criterion may not maximise the addition to total output per capita. More labour, rendering a technique less capital intensive, could be employed with any given level of fixed capital, but rarely techniques which employ more labour

(1) W.A.Lewis : "Economic Development with Unlimited Supplies of Labour", The Manchester School. 22, 1954, pp. 139-91.
" : "Unlimited Labour: Further Notes", Ibid. 26, 1958, pp. 1-32.
J.C.H.Fei and G.Ranis : Development of the Labour Surplus Economy. Irwin, Homewood Ill., 1964.
" " : "A Theory of Economic Development", A.E.R. 51, 1961, p. 533 ff.

per unit of capital yield a larger output per unit of capital.(1) Given that capital was the scarce factor the problem was not to save the use of it, but to maximise the output to be obtained from it.

Furthermore the early optimism about transferring static disguised unemployment from agriculture to industry has been challenged quite convincingly in theory by a number of authors since Gudin, Viner and Schultz expressed their scepticism about it. The classical assumptions were challenged as it was found that substantial numbers of workers could not be released from agriculture without a drop in production, unless the process were mechanized or the holdings increased in size. There was, in a neo-classical sense, no level of agricultural labour force at which its marginal productivity was equal to zero.(2) Despite the considerable post-war mechanization in the Greek agriculture, the fragmentation and small size of the average Greek holdings made this task quite difficult in Greece during the fifties and early sixties.

Additionally manufacturing employment in Greece was growing more slowly than either output or capital. In fact the rate of absorption of labour fell below the rate of growth of urban population by a wide margin,(3) particularly so the rate of absorption of labour in the manufacturing production process. The employment lag became obvious not only in the more advanced sectors but also in more traditional industries like textiles, clothing and shoes. Naturally the modernization of old capacity in a relatively more capital-intensive way accounted for part of this low labour-absorption

(1) International Labour Office: Employment Objectives in Economic Development, Report of a Meeting of Experts, Geneva, 1961, p. 67.

(2) Dale W. Jorgenson: "Surplus Agricultural Labour and the Development of a Dual Economy", Oxford Economic Papers, Vol. 19, No. 3, Nov. 1967, p. 300.

(3) For similar cases in other parts of the world see:
Kailas C. Dootor and Hans Gallis: "Modern Sector Employment in Asian Countries: Some Empirical Estimates", International Labour Review, LXXXIX, December 1964, p. 558.
United Nations: Towards a Dynamic Development Policy for Latin America, New York, 1963, p. 23.

rate. The productivity of labour increased rapidly as a result. Such relatively slow growth of manufacturing employment was inconsistent with the implications of constant productivity of labour under disguised unemployment in the classical theoretical framework, but consistent with the stipulations of the neo-classical approach,(1) which hardly allowed for a rapid absorption of surplus unemployed agricultural supply of labour. Further considerations made the possibility of transferring static disguised unemployment from agriculture to manufacturing industry even more unlikely.

First that in the Greek economy, as in other less developed economies, between the foreign-financed sectors and the domestic sectors there arose differences in factor prices, since the foreign investors were able to pay higher prices for land and labour to attract more efficient units of factors from the domestic sector. The great shortage of skilled labour, a scarce factor in a developing economy,(2) could not of course be met by foreign skilled labour which was generally unwilling or unable to work in Greece together with Greek unskilled labour. Only a few foreign technicians could be brought to handle equipment in the first stages of operations.

Considerable tax reliefs and other incentives enjoyed by the foreign investors(3) further distorted their cost structure. The price of capital in the foreign-financed sector, in addition to the above, was in some cases lower than it was for the local Greek concerns and given that most of the foreign enterprises were familiar

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(1) Dale W. Jorgenson: "Testing Alternative Theories of the Development of a Dual Economy", The Theory and Design of Economic Development, Adelman and Thorbecke, Eds., John Hopkins Press, Baltimore, 1966, p. 47.

(2) Albert O. Hirschman: The Strategy of Economic Development, Yale University Press, New Haven, Conn., 1958, p. 145.
H. Myint: The Economics of Developing Countries, Hutchinson and Co., London, 1964, p. 137.
W. Baer and M.E.A. Herve: "Employment and Industrialisation in Developing Countries", Quarterly Journal of Economics, 80, 1966, p. 100.

(3) See p. 82.

with capital-intensive technology, their factor-proportions were capital-intensive by Greek standards and consequently out of line with the factor endowments of the Greek economy which was facing the problem of maximum utilisation of the surplus labour force.(1) There were productive activities which were sometimes characterised by different functions for each sector: the foreign-financed sector was in asymetry with the rest, and its productive relations distorted the industrial balance. The existence therefore of a typical rigid factor proportions problem(2) becomes apparent, where the choice of techniques was limited to the relatively capital-intensive ones, so that there was surplus personnel employed in a fair number of factories.

In such cases we find that from the point of view of the individual foreign investor in Greece, untrained and undiciplined labour was less preferable to more machines. Even if the higher marginal productivity of labour in the foreign-financed sector allowed for wages higher than in the domestic sector (under the assumption of perfect mobility of labour from the subsistence agricultural sector to the foreign-financed industrial sector under the stimulus of such higher wages), this would not necessarily involve any substitution of labour for capital if the foreign-financed concerns adhered (as they did) to capital-intensive technologies and rigid conceptions of input-coefficients developed in and imported from more advanced economies. Under those circumstances the price of labour continued to be low in the subsistence sector. The "modernization" and automation that occured only partly explains the apparent paradox of

(1) H.W. Singer: "The Distribution of Gains between Investing and Borrowing Countries", A.E.R., May 1950, p. 473 ff.

(2) R.S. Eckhaus: "The Factor-Proportions Problem in Underdeveloped Areas", A.E.R., XLV, September 1955.
Hans W. Singer: International Development: Growth and Change, McGraw-Hill, New York, 1964, p. 59 ff.

the divergence between the course of employment and production. Industrial output multiplied several times when industrial employment increased much less. Of course some part of this divergence is explained by the increase in the "effective" employment of workers and the increase in the average working hours. Handicrafts, accounting for over one third of industrial employment were much less affected than the larger units.(1) In other industries nevertheless, in view of the differences in factor prices and of the significant discontinuities in factor inputs, all combinations of inputs did not necessarily lead to a shift to new techniques, whatever the inducements had been. In fact very few productive alternatives are permitted by the nature of the production function and the locus of technological change in a case like this(2) and there is no reason again to believe that the new techniques wherever applicable, led to labour-intensive production alternatives.

With the persistence of shifting and fluctuating differential factor proportions and prices (in the place of fixed "terms of trade" wage-differential between agriculture and industry, as stipulated by the conventional "classical" approach of the dual economy theory), social and economic difficulties arose in Greece from a situation of not merely a dual economy, but also of a "dual society" in the Nurkse sense, occurring in parts of Greece where social conditions for the diffusion of modern technology were actually the reverse of favourable at times.(3) Labourers did not always respond to an increase in money supply resulting in higher wages and were not always attracted to new industries, even where considerable unemployment prevailed. This could of course also be due to the restricted

(1) Food and Agriculture Organisation: Greece, Rome, 1959, p. II 30.
(2) Harvey Leibenstein: "Technical Progress, the Production Function and Dualism", Banka Nasionale del Lavoro Quarterly Review, No. 55, December 1960, Rome. Reprint No. 177, Institute of Industrial Relations, University of California, Berkeley, 1962, pp. 5-6.
(3) Cf. Benj.Higgins: "The Dualistic Theory of Underdeveloped Areas", Economic Development and Cultural Change, January 1956, pp. 92-112.

TABLE LXXVI

Factor-Saving Bias in Technical Advance at Constant Relative Factor Prices.

	20-22 Food Drink Tobacco	23 Textiles	24 Clothing Footwear	25-26 Wood Cork Furniture	27-28 Paper Printing	29-32 Leather-Rubber Plastics Chemicals
1958						
1959	1.068026	0.966380	1.037566	0.978159	0.961066	1.178672
1960	1.110463	1.096961	1.196959	1.064327	0.968980	1.134082
1961	1.049428	0.961023	1.169994	1.106893	0.940775	0.815830
1962	1.093612	1.009114	1.056360	1.010379	0.957991	0.981192
1963	1.016285	0.898732	1.068037	1.257258	1.069097	1.031259
1964	1.113760	1.029981	0.982585	1.137478	0.980065	0.942721
1965	1.155569	1.096878	1.192631	1.083385	0.967512	1.065015
1966	1.114526	0.926467	1.121627	1.058807	1.038085	0.938022

	33 Non-metallic Minerals	34 Basic Metal Industries	35-37 Metal Prod. Machinery Electr.Eq.	38 Transport Equipment	39 Miscellaneous Industries
1958					
1959	0.924181	1.158047	0.967887	1.573662	0.890253
1960	1.017135	1.393919	1.092451	1.152719	0.910015
1961	1.113602	1.058816	1.026873	1.376346	1.154068
1962	1.071371	1.059555	0.919415	1.167710	0.882902
1963	1.115295	0.871929	0.940815	1.252128	0.833037
1964	1.146875	1.170824	1.062620	1.145480	0.945699
1965	1.210483	0.841088	0.993944	1.123686	0.910869
1966	1.023319	1.699043	1.044921	1.112400	0.914605

Note : If the entries are less than unity the technical advance contains a capital-saving bias. If they are greater than unity the technical advance has a labour-saving bias, so that the proportionate saving in labour is greater than the proportionate saving in capital.

The measure isolates the changes in capital per head arising out of technological change and indicates the extent in the change in capital per head if technical knowledge alone changed. The formula employed with inputs expressed per unit of output is

$$D = \frac{\bar{K}_{t+1} / \bar{L}_{t+1}}{\bar{K}_t / \bar{L}_t} .$$

A Laspeyres form index is employed throughout.

Source: W.E.G. Salter: Productivity and Technical Change, Cambridge University Press, 1966, pp. 31-32.

mobility of labour, particularly in the poorest remote areas of Greece like Epirus, Crete, Southern Peloponnesos and Thrace. Despite (rather moderate) trade union pressures for uniform wage-rises to the level of wages in the foreign-financed sectors of the economy, there was undoubtedly increased tension and social dissatisfaction, which eventually found way to massive emigration abroad. Greece did not face a situation similar to depression unemployment in developed western economies which could be countered by strengthening effective demand. Simply, and contrary to what one might expect, there was not always unlimited (if not efficient) labour force available on the spot in Greece to start new industries, even where ample foreign capital were made available for this purpose.

The pattern of technical advance which is given in Table LXXVI seems to confirm this analysis. It is true that in branch 29-32 there is evidence of considerable capital-saving bias in the technical advance in some years, in a branch where a very high level of inflow of foreign capital was taking place at the same time. But then the same pattern also exists for textiles (23), paper and printing (27-28) and metal products, machinery, etc. (35-37), all with rather small or very small foreign capital share. The results in branch 34 (basic metal industries) show wide fluctuations, rather more connected with capacity in capital stock than with labour using techniques from the part of foreign investors. Indeed, foreign investment, which in the end of the period accounted for nearly half of the capital stock in this branch was almost exclusively concentrated (see p.) in one single investment in aluminium (by the French Pechiney Co.), an enterprise that was far from labour using. Even in branch 29-32 foreign investments mainly in oil refineries (ESSO), petrochemicals and rubber industries could not account for much of this (at times) capital-saving nature of technical advance. In other branches of the industry of course the evidence is overwhelmingly of a labour-saving bias. It is therefore clear that the available evidence does not support a link of foreign enterprises with a labour-using bias in the technological structure of the manufacturing industry.

TABLE LXXVII

Average Daily Basic Wage Excluding Overtime and Fringe Benefits
(Converted to Constant 1958 Prices)

	20-22 Food Drink Tobacco	23 Textiles	24 Clothing Footwear	25-26 Wood Cork Furniture	27-28 Paper Printing	29-32 Leather-Rubber Plastics Chemicals-Petrol
1958	57.17	49.63	58.11	52.41	55.57	52.96
1959	57.63	49.29	58.82	54.55	58.54	54.74
1960	58.50	48.99	62.00	55.91	59.72	53.98
1961	58.54	50.05	64.40	61.80	62.62	57.22
1962	62.18	53.45	65.71	66.28	62.16	58.05
1963	64.82	56.08	65.95	69.68	62.75	59.85
1964	68.38	58.35	67.90	71.99	65.45	63.34
1965	71.25	58.72	70.78	74.90	69.51	65.21
1966	77.68	61.54	76.70	84.18	74.57	69.80

	33 Non-metallic Minerals	34 Basic Metal Industries	35-37 Metal Prod. Machinery Electr.Eq.	38 Transport Equipment	39 Miscellaneous Industries
1958	70.06	68.06	64.52	51.47	76.45
1959	75.97	65.90	63.93	56.43	77.39
1960	75.33	64.97	63.98	56.32	75.64
1961	79.44	68.01	66.87	63.48	74.27
1962	78.96	66.55	66.62	67.00	73.70
1963	81.81	65.42	66.50	68.89	76.98
1964	82.76	68.24	69.46	70.41	78.26
1965	86.34	70.13	71.47	75.04	79.56
1966	90.79	74.09	77.57	84.19	81.04

Source: Social Security Organisation: Bulletin (Monthly) on Wages (Mimeographed). Based on Sample Evidence on Firms Mainly in the Capital Area. Various Issues, January 1958 to January 1967.

Note : All entries grouped from more detailed breakdown and converted to constant 1958 prices using National Income deflators.

CHAPTER ELEVEN

Problems and Prospects of the Industry: A Production Casebook by Sector.

A. The Food-Drink-Tobacco Industries

The importance of this group of industries (ISIC 20-22) in the period 1953-1966 can hardly be stressed enough. The net capital stock invested in the industry in 1953 (1,583 m. dr.) was the third highest of all industries after textiles (23) and chemicals and allied products (29-32). By 1966 food etc. industries had the highest net capital stock in all industry. This was accompanied by the highest labour input by a very wide margin both at the beginning and at the end of the period. The factor shares indicate a rather constant pattern relatively speaking, with fluctuations of five percentage points at the maximum around near-even beginning- and end-of-period rates. The residual factor increases with fluctuations at a rate which is rather below that in many other industries and foreign capital participation at the end of the period is the lowest in the industry.

The industry is basically a conglomeration of unrelated industries based on agriculture, husbandry and fishing, on perishable therefore commodities. The heavy dependence on sources of raw materials often unavailable in Greece has been eased in recent years when more non-perishable materials are produced, such as cereal products, bakery products, vegetable oils, beverages, fruit-juice drinks, jams and chocolates, making the expansion of the industry more a function of market conditions of demand than it was at the beginning of the period. The industrial technology is related to the know-how in devising and operating commercial processing, not necessarily employing factory product-development techniques, but rather more elementary domestic-handicraft methods. Common operations and functions and technology in such unrelated methods of production were few for the greater part of the period, but were gradually being introduced

at an increasing rate because different food processes were becoming standardised using similar operational techniques. The factory-technology involves cutting, mixing, heating, refrigeration, adding chemicals, cleaning, separation, grading, dehydration operations. At the distribution level the technology involved deals with inspection problems, packing, canning, handling, labeling, storage, handling, moving, transport, distribution and control.(1) The importance of innovations in packaging is enhanced by the interindustry relations potential of producing bottles and glass jars, cans, aluminium foil, plastic containers, cartons, etc. Still greater is the importance of industrial chemistry in applied research for additives, flavours, stabilisers, emulsifiers, etc. Obviously a large number of smaller firms often used indigenous methods in a traditional manner, ignoring the advance of food technology in drying fruit (raisins or figs) or fish, producing Greek cheeses on cottage or nomad production basis, processing wines or edible olive oil.

The near complete absense of a nucleus of food technology research centres in Greece is linked to the general lack of food technologists and nutritionists, which again is linked to the lack of a balanced training programme involving research scientists as well as technicians and maintenance personnel. Few exceptions like the Tobacco Institute or the wines and spirits centres existed to provide technical and scientific services. The shortage of technical personnel extended to skilled mechanics as well as management. Few establishments were actually designed by experienced food scientists and little of the processing equipment was actually selected by an expert. A programme to train local personnel to handle skilled jobs or advanced equipment would of course have been preferable to importing technical talent to fill the technological gap. Neither

(1) U.N. Industrial Development Organisation: Food-Processing Industry, Monographs on Industrial Development, Industrialisation of Developing Countries: Problems and Prospects, Mongraph No. 9, I.D.O., Vienna, U.N., New York, 1969, p. 9.
U.N.: Industrial Development, Asia and the Far East, E/CN. 11/752, Vol. IV, New York, 1966, pp. 435 ff.

in fact happened in Greece. Few foreign experts or technicians were ever brought in and the local training of chemical engineers and other specialists with instruction in food technology hardly figured in Greek schools or biological science establishments in the modern sense of a training schedule before 1966.

The lack of such personnel reflected not only on the methods of production but on the construction of the buildings themselves, not so much in terms of weather protection or ventilation, but rather in terms of sanitation and protection against dust, insects, microorganisms, vermin and rats, etc. The technical side requires preengineered factory buildings and warehouses of high quality, insulated panels, epoxy-coating of porous concrete surfaces and use of ceramic tile walls. The surprising and very disquieting findings of a zealous general prosecutor in Athens in the early sixties when raiding with a group of police officers the premises of known bakery and confectionery establishments only to find them rat-infested and lacking basic sanitary standards created a huge scandal of unprecedented dimensions, but reflected just this kind of lack of standards and of control that characterised some parts of the industry.

Some of those problems were inevitably related to investment factors. The food processing industries were generally highly competitive and required a high volume of sales which given the low competitive margin left only small profits per unit of sale. A minimum dependence on the skills of workers and supervisors was necessary at the same time and both those conditions pointed towards the necessity of large-scale establishments which would at once provide satifactory returns because of economies of scale and in an industry where labour-intensive techniques are uneconomic, would be more mechanised than the small and less well equiped domestic-handicraft concerns.

The cost of building a medium-large fully mechanised bakery in a country like Greece right at the end or a little after the end of our period (1966) was about $ 1 m. A sugar refinery was nearly $ 20 m. and a huge brewry about $ 40 m. A continuous cooker-cooler of

the hydrostatic variety used in canning cost $100,000. An immersion-spray quick freezer (of 3,000 pounds per hour capacity) was about $ 90,000 and as much again in installation costs. A small machine to package milk in bags would be $ 20,000.(1)

Against such costs a selection of the largest foreign investments (ignoring the more numerous medium- and small-scale ones) was calculated (at current prices) to have made the following capital outlays by firm :

SELECTED MAJOR FOREIGN INVESTMENTS

1956	$ 150 000	Tobacco Processing
1957-1958	$ 324 314	Tobacco Drying
1958	$ 80 800	Canned Foods
1959	$ 79 915	Cheese Processing
1959-1963	$ 659 874	Tobacco Processing
1960	$ 140 000	Juices
1961-1964	$ 192 000	Milk Industries
1962	$ 560 000	Fruit-Vegetable Processing
1962	$ 182 000	Tobacco Processing
1963	$ 708 000	Juices
1963-1965	$ 250 000	Beverages-Beer
1963-1966	$ 570 000	Tobacco Drying
1963-1966	$ 65 000	Food Preparations
1964	$ 604 000	Fish Processing
1964	$ 150 000	Juices
1966	$ 160 000	Fishery Products
1966	$ 159 000	Tobacco Processing

Source : Ministry of Coordination, Foreign Capital Direction: Long-Term Investments under L.D. 2687/1953 "On Investment and Protection of Foreign Capital", Mimeographed, Athens, Various Issues, January 1961 to January 1967.

The rather small size of foreign establishments could be attributed to the congestion in this particular field, already expoited by Greek entrepreneurs. This made foreign investors unwilling to try and penetrate an existing structure. Additionally, given the lack of personnel one could expect the problems to be larger in starting a plant (in what concerns quality and sanitation) than in supervising an already operating concern. Routine quality testing and control could always be taught to technicians in an easier manner once procedures of the production process are established. But foreign investors obviously shied away from any programme to train local unskilled personnel to handle skilled jobs or repair equipment before starting their operations.

Perhaps the best recommendation in that direction was made by the U.N. Industrial Development Organisation, which suggested that the creation of commercial plants in food industries should be preceeded by pilot-scale operation of two to three years, to establish correct processing conditions and offer training, as a nucleus to food technology research centers. Even though financial assistance could be obtained towards that goal from a U.N. special fund, with particular reference to financing expensive equipment or refrigeration units, somehow this particular possibility was never taken up by foreign (or at that by Greek) investors.

The mechanical equipment for the food industries is generally imported from abroad rather than made locally and Italy, W. Germany, Belgium, Holland, Denmark, the U.S. and Hungary have been the main suppliers. Some bakery, oil processing and canning equipment was produced in Greece.

The structure of the industry by sub-sector at the three-digit ISIC code level is now discussed in the paragraphs which follow.

The meat products industry could expect consumption of their products to increase in the end of the fifties and the beginning of the sixties as the demand of the precut, portion-controlled, ready-to-cook meats was expected to reflect the changes in the level of income, in tastes and in dietary conceptions.(1) The actual change was smaller than expected as there was considerable resistance to the acceptance of frozen meats ("they lose their 'flavour' and their 'nutritional' qualities"), so that the extensive improvements in processing and handling did not materialise during the period we are examining.(2) Freeze-drying was also introduced very slowly. One factor in favour of this trend for ready-to-cook meats, nevertheless, was the expansion of the institutional market of hotels and restaurants for standardised, controlled supply of meat and poultry.

Frozen fish did not have an easier penetration of the market, despite a fleet of ocean-going fishing vessels partly financed by fo-

(1) Cf. J.R. Moore and Richard G. Welsh, Eds.: "Meat Industry", Market Structure of the Agricultural Industries. Iowa State University Press, Ames, 1966.

(2) The need of modern slaughterhouses was also acute in the sixties.

reign capital. Poultry food preparations were scarcely more advanced than other meat industries and all capital equipment was imported. So was that for the sausage and salami industries. Given the high raw-material cost, little emphasis was given at the time to by-product utilization. Foreign investment came in 1958 ($ 80,800 for canned foods), 1963-66 ($ 65,000 for food preparations), 1964 and 1966 ($ 604,000 and $ 160,000 for fish foods).

Dairy products were in need of drastic standardization at the end of the period with regard to the production of butter, non-fat dry milk, dry whole milk and cheese. This was not surprising, given the cottage- or even nomad-production traditions of this sector.(1) Fluid milk and ice cream were beginning to be processed through centralized control systems in the Athens area in the early sixties. The growth of multipurpose milk processing plants would inevitably increase the flexibility of output through mechanisation and standardization.(2) Pasteurization and refrigeration equipment was all imported from abroad, although some storage containers were made locally. Foreign capital came in 1959 ($ 79,915 for a cheese-processing factory) and again in 1961-64 ($ 192,000 formilk industries).

The processing of fruit and vegetables was not as developed in Greece during this period as one might expect it to be. In 1964 for example only 2.8% of all horticultural production entered into processing.(3) Over half of the large enterprises were owned by co-operatives (seven in number), which were well organised and had modern equipment equal in quality to that of the major privately-owned firms (five in number). The main capacity of the industry centred around the dried vine-fruit industry (raisins-currants) the canned-fruit industry and the fruit-juice industry.(4) The production potential was far in excess of Greece's requirements and exports could be increased in that direction. Some considerable foreign investment was channeled into such activities, including $ 140,000 in 1960 and $ 150,000 in 1964 for fruit-juices and $ 560,000 in 1962 for fruit-vegetable processing.

(1) Employment, as a result, was not expected to increase particularly among the unskilled and semi-skilled material-handling jobs or the unskilled cleaning jobs.

(2) U.N. F.A.O.: A Review of Cheese Production, Consumption and Trade in Some Developed Countries. Commodity Bulletin Series, 41, Rome 1966, p.16.

(3) O.E.C.D.: Production of Fruit and Vegetables in OECD Member Countries : Greece and Japan. Paris, 1968, p. 20.

(4) Natural juices increasingly substituted for carbonated beverages.

A further $ 708,000 came in 1963 for the procession of fruit juices.

In the flour and other grain mill products industry no major modernisation plans were made at the time. The possible introduction of agglomerated flour was not even discussed then, but neither (unfortunately) was the more efficient pneumatic materials handling. The conventional roller milling equipment was used everywhere and impact milling machines were not introduced in the sixties. Minor new instruments of scientific control, nevertheless, were gradually being introduced. The efficiency of the various sizes of establishments is not clear in the Greek case, with small bakeries (the majority) having generally higher costs but good profits on sales. The technological changes in floor milling would require larger capital outlays and an increased level of operations. During the period 1953-1966 technology was only changing very slowly and most of the old equipment was retained within the industry, particularly in the provinces.(1) It would not be unrealistic to suppose that the average age of the equipment was perhaps the highest here than in any other food industry. In some cases special mixing machines could bring about savings in raw material costs and in terms of intensive mechanical working with fewer losses and reduced costs. It is unfortunate that such methods(2) were not even contemplated in Greece at the time. This phenomenon of not exploiting innovations which would reduce the production costs per unit is explained on a number of grounds. First that the extent of mechanization in Greece was increasing only slowly. Some (even minor) technical advances required synchronization with other industries and concentration of production in fewer firms, which would involve mergers and takeovers in an expansion of vertical and horizontal integration.(3) The effects of such economies of scale

(1) This is an international phenomenon. See:
P. Maunder: The Bread Industry in the U.K.: A Study in Market Structure, Conduct and Performance Analysis, Dept. of Agricultural Economics, Univ. of Nottingham, Dept. of Social Sciences and Economics, University of Technology, Loughborough, 1970, p. 79.

(2) D.W.E. Axford, N. Chamberlain, T.H. Collins, G.A.H. Elton: "The Chorleywood Process", Cereal Science To-day, Vol. 8, No. 8, 1963.

(3) Cf. British Baking Industries Research Association: Report for 1965-1966, p. 3.

to result from a reduction in the number of mills would presumably allow the larger units to have an advantage in standardisation and in modernization (introducing continuous processing techniques in mixing, baking and wrapping and larger use of pneumatic conveyors),[1] and would bring about a continued growth in productivity (in terms of output per manhour).[2] The true effects of such a concentration have long been widely discussed in theory and much depends in this case on institutional forces and the market behaviour.[3] It is indisputable that research and development in bringing about (for instance) an increase in the shelf-life of bread or an increase in mechanization in production of biscuits and crackers (which are amenable to such techniques because of their lower perishability) is only possible where large units are concerned.[4] In the U.K. the bread industry spends 0.1% of its turnover to such research. Another aspect of research in Greece would be on the prospects of decreasing employment in a sector where labour costs are between 5 and 10 per cent of the industry's sales income. The industry's mechanical equipment in the period before 1966 was imported from Germany and Italy, but a fair share of it was made in Greece (particularly in the baking sector). No foreign concerns invested in Greece in this sector in the period 1953-1966.

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(1) National Prices and Incomes Board: Report No. 17. Wages in the Baking Industry, para. 21, p. 7. The experience of the English market discussed therein.

(2) Cf. R G. Walsh and B.M. Evans: Economics of Change in Market Structure, Conduct and Performance, The Baking Industry. University of Nebraska, Lincoln, 1963, p. 9 ff.

(3) N.R. Collins and L.E. Preston: "Concentration and the Price Cost Margins in Food Manufacturing Industries", Journal of Industrial Economics, Vol. XIV, No. 3, July 1966, p. 266-242.
H.M. Mann: "Seller Concentration, Barriers to Entry and Rates of Return in Thirty Industries 1950-1960", Review of Economics and Statistics, XLVIII, No. 3, August 1966, p. 296-307.
J.S. Bain: "Relation of Profit Rate to Industry Concentration", Quarterly Journal of Economics, LXV, No. 3, August 1951, p. 293 ff.

(4) D. Swam Mc Lachlan: Concentration or Competition: A European Dilemma, P.E.P., London, 1966, p. 15 ff.

The development of beet sugar industry in the early sixties in Greece took account of the economics of industrial location with the main factory situated near the beet fields, as beets are perishable. Sugar is processed and stored for later distribution. There were model centres in the vicinity of the factory in Larissa and plans to organise beet-growers' co-operatives.(1) The products were pretty homogeneous, with no particular preference in special types or brands of sugar. Despite this the overhead costs in this industry were pretty high. No foreign investment was channeled in this activity.

The liquor industry was facing the problem of large outlays in bottling and packaging. In wine for instance the cost of bottling was in some cases twice the price of wine at the winery. No revolutionary technological changes were expected to take place in this activity. Most of the equipment was imported from abroad, although more than half of all wine production was taking place in establishments of rudimentary technological sophistication. This may account for the lack of standardization of the product which had adverse effects on exports. The malt brewing chemical process industries (beer production) was expected to increase at a quick rate. And indeed after the termination of the effective monopoly of one firm a number of foreign concerns opened brewing establishments in Greece, the first one bringing in $ 250,000 in the 1963-65 period. New instrumentation and automatic handling controls were expected to increase significantly the production capacity in an industry where the labour costs were not very high.

Tobacco manufacture was a very important sector in the Greek manufacturing industry. The technology was highly mechanized but relatively simple. The manufacturing economies to scale were small and the difference between large and small industries in what concerns technology was the number of machines rather than the speed or the size of equipment.(2) Major labour-saving developments, nevertheless,

(1) International Sugar Council: National Sugar Economies and Policies, Vol. I, London, 1963, p. 38.

(2) E.B. Alderfer and H.E. Michl: Economics of American Industry. Mc Graw-Hill, New York, 1957, p. 633. The American experience in this field offers some valuable insights into the Greek problems.

could be expected. More automatic, electronically controlled processing equipment, mechanized materials-handling equipment, automatic filter attaching devices, more efficient cigarette-packaging machines and conveyor systems to improve the process flow were gradually finding their way into the productive process. Some important foreign investments took place in this branch including $ 150,000 as early as 1956, $ 324,314 in 1957-58, $ 659,874 in 1959-63, $ 182,000 in 1962, $ 570,000 in 1963-66 and $ 159,000 in 1966 all for tobacco processing or tobacco drying. Although some of this investment was channeled into existing Greek firms, more was to establish new units which were to expand in the years to come. The general field of activity of those foreign-capital-importing firms, nevertheless was tobacco-storage and tobacco-drying so that foreign investors had yet to contribute to productivity-increasing industrial process technology in this branch. One could perhaps see the point in actually preventing foreign manufacturing from penetrating an activity in which Greek industry has established such a successful tradition.

The technology employed in food industries is characterized by the quality of the manufacturing process (with homogeneous bulk products). Product technologies by contrast are characterized by the quality of the product itself and are more important in durable equipment industries (machinery, car industries, electronics and instruments). The food industry (like chemicals and pharmaceuticals) being a process industry would benefit from imports of technology relative to plant construction, production know-how and other problem-solving services. The quality and quantity of such technology inputs in terms of licences, expert advice, etc., in the Greek food industries during the period under consideration is unknown, but can be inferred of low order. And yet imports of technology ought to be encouraged perhaps more than imports of capital in this sector. As such one would have liked to see before 1966 expert advice of the kind that came only after that period from U.N. F.A.O. and the British Agricultural Export Council for the installation of modern slaughter-houses

in northern Greece,[1] or from the British Agricultural Export Council for the establishment of condensed- and dried-milk industries. Unfortunately little such technological expretise came earlier on, even in industries very much in need of it, like products for infant nourishment, dietary foods, animal feeding preparations, meat packaging, or standardised quality wine production which had barely started operating before 1966 and was coupled to the problem of remewal of vineyards.

A final structural problem of some importance that had to be solved was that emerging from the "mixed-economy" system of cooperatives and private firms. Cooperatives operate where a natural local monopsony or raw materials can develop, resulting in exploitation of farmers, but friction often remains and perhaps a solution of mixed enterprises could be more viable in some cases, to encourage cooperation, help reduce excess capacity and withstand the increasing foreign competition.

(1) Those installations would include animal markets, feeding stables, slaughterhouses, freezers, and possibly plants for processing sausages and similar products, canning factories and other installations for utilization of by-products.

B._ The Textile Industry_

Textiles remained for a long period of time to the end of the fifties the largest single industry in Greek manufacturing as far as the net capital stock is concerned. The labour input was also relatively high, but not expanding significantly. A high capital share with some considerable fluctuations was observed and the residual factor showed a smooth increasing path at an average level. Foreign capital participation was the lowest in industry up to 1963 and was the second lowest at the end of the period.

Textiles traditionally are a favourable vehicle for a breakthrough at the initial stages of industrialization in developing countries and it is not surprising that there was some considerable capacity in this industry in Greece even before the war. The importance of cottage industry traditions in the first stages can be strong, but is soon overtaken by the kind of financial outlay which will dictate the type of machinery to be installed. Automation is very important with rising labour cost and a degree of automated handling of materials between processes is necessary. Automation involves three things: a. advanced mechanization b. control process and c. use of electronic computers.(1) The third was never introduced in Greece in the sixties and anyway complete automation is virtually non existent with the exception of very few advanced concerns in developed countries. But textiles can now be highly capital-intensive and very mechanised.(2) It was one of the two most mechanised industries in Greece in the period 1953-66 (see Table LXXIII).

The willingness and the ability of Greek firms to plan technological changes and take advantage of the advances in scientific research can be put in question. There is little information on whether some parts of the industry were more receptive to new ideas and technological innovation, or whether those which in fact did show such receptiveness remained competitive. It is agreed that

(1) U.N. International Development Organisation, Vienna: Textile Industry, Monograph No. 7, New York, 1969, p. 37 ff.

(2) U.N.: Report of the U.N. Interregional Workshop on Textile Industries in Developing Countries, New York, 1966, pp. 64-67.

basic technological research was beyond the competence of the small Greek firms, which could only experiment by trial and error operations within the narrow limits of their resources. Others operated on the principle that it is not necessary to adopt the most modern technique. It is generally accepted that quicker machines involve lower unit labour requirements. The introduction of new vintages of machinery incidentally can be labour saving for an additional reason: fewer machines may now be needed to replace older models. Additionally, built-in maintenance in new machines reduces the maintenance requirements. It becomes clear therefore that those manufacturers who would not replace old equipment because it was previously not operating at full capacity (so that the additional capacity of the new equipment was not required), were obviously missing the advantages of labour-saving changes in production and of reduced maintenance costs. The importance of large economies of scale in larger units, and of vertical integration linking the manufacture of material to the manufacture of garments or other processes was generally understood, but the firms were generally small and few if any would combine diverse operations.

It is observed nevertheless, that the life-span of equipment in textiles (the mechanical life-span that is, because the economic life-span could be smaller) is not very long: 14 years on two-shift operation for a cotton textile spinning machine.(1) Additionally a substantial proportion of plant and machinery installation may now have to be replaced annually to allow the factory to operate at a reasonable level of efficiency. We should note that in the case of the wool textile machinery the physical deterioration which takes place is smaller because of the low speeds at which the equipment is operated.(2) A slower rate of innovation is observed there (3) and

(1) Cf. International Federation of Cotton and Allied Textile Industries: The Textile Industry in the Development Decade, Fürsprecher Mario Ludwig, Ed., Zürich, 1970, p. 81.

(2) G.C. Harcourt and D.H. Whitehead: "The Wool Textile Industry", Alex Hunter, Ed., The Economics of Australian Industry, Melbourn University Press, 1965, p. 454 ff.

(3) G.F. Rainnie: "The Machine Makers and Technological Change", G.F. Rainnie, Ed., The Woollen and Worsted Industry. An Economic Analysis, Clarendon Press, Oxford, 1965, p. 75 ff.

if the international experience applies to the Greek wool industry, one would expect some of the existing small or medium firms with outmoded equipment to continue to operate for some time to come in their traditional way, by executing small orders of special care and attention. Whether this degree of competitiveness would allow them to survive in wider international markets nevertheless is far from certain.

The considerable expansion in output per worker, particularly in spinning, was achieved largely by constant improvement and enlargement of the capital equipment. In the woollen industry the equipment employed is of three kinds : a. mule spinning machinery for flannels and tweeds b. ring spinning for worsted yarn for the manufacture of wearing apparel and for knitting yarns c. shoddy spinning for blankets and rugs.(1) English equipment enjoys a reputation of reliability and good quality. Competition comes from the Common Market countries and recently from Japan and Eastern Europe. An important factor is the long delivery dates for equipment and the frequent delays involved. Interest in plant modernisation was generally expected to increase and the accompanying capital expenditures to rise.

Processing of jute was of small importance in Greece, but natural silk was more widespread, mainly organised on a traditional "domestic" industry system. Machine output in hosiery and other knitting equipment industries was also rising due to multiple feeds. The speed of knitting or sewing, often dependent on female labour, further contributed to the steady expansion. The hosiery industry was the last of the major textile trades to remain organised on the "domestic" production basis and is classed among the textile trades although it has affinities to the clothing industry.(2)

A note should be made of the carpet and rug industry because of its expansion capacity. There are external diseconomies of scale

(1) Cf. G.W. Furness: "The Cotton and Rayon Textile Industry", The Structure of British Industry. Vol. II, Duncan Burn, Ed., The National Institute of Economic and Social Research - Economic and Social Studies XV, Cambridge University Press, 1964, Chapter XIV, p. 184 ff.

(2 It very much depended for steady expansion on the speed of knitting and sewing and the skill of the largely female labour force.

associated with this industry, mainly due to a relatively inelastic factor market. There is a need of wool supplies from abroad as the availability of coarse cross-bred wools is limited. Argentine (Buenos Aires), Syrian (Aleppo), Indian (Yellow), Pakistan and New Zealand imports were representative of a typical blend of carpet wool. Innovations in man-made fibres and in the tufting process were expected to bring about a change in the structure of the industry, although not necessarily a reduction in costs : the carpet manufacture traditionally has high variable costs and more so with tufting innovations.(1) There was a need of adequate low-cost supply of pile fibers, and the deep market penetration of man-made fibres, with their lower unit labour requirements was expected to bear with some effect on those variable costs. The expansion of the man-made fibres industry is discussed elsewhere under plastics (branch 29-32).

Employment in the textile industries has shown a leveling off in some sub-sectors and even the occasional decline, despite the overall expansion of production in the sector. There were many production workers (with a high percentage of female labour) in relation to all employees. Unskilled labour was only a small proportion of all jobs. The demand for technicians was increasing and more formal training was needed for operating and maintaining equipment.

The structure of management was very unsatisfactory as a whole, with many establishments being merely family concerns and therefore being unwilling to bring in outside talent at the management level at the expense of family members. The inefficiencies in budgeting, cost-accounting have been attributed largely to lack of entrepreneurial function(2) and the textile industry has been the most typical of all in this respect. The importance of a reorganisation of the entrepreneurial function in the textiles industry and the need of

(1) The U.S. experience in this respect could be valuable.. See : William A. Reynolds: Innovation in the U.S. Carpet Industry 1947-1963. D. Van Nostrand, Princeton, 1968, pp. 66, 129.

(2) George Coutsoumaris: Op.cit., pp. 134-36, 314-15.

a re-orientation towards more modern principles[1] was not always widely understood or accepted in this sector at the time.

SELECTED MAJOR FOREIGN INVESTMENTS

1962-1965	$ 743 646	Cotton Spinning
1963	$ 500 000	Textiles
1963-1965	$ 666 700	Weaving Factory
1963-1966	$ 3 000 000	Spinning Mill
1964	$ 668 738	Spinning Mill
1964	$ 281 300	Textiles
1964-1966	$ 500 000	Cloth Fabrics
1964-1966	$ 500 000	Cotton Mill
1966	$ 500 000	Cotton Mill

Source : See note under foreign investments in food industries above.

Foreign investment came all near the end of the period, most of it in spinning and cotton mills. Earlier capital imports were small and diverse, with no perceptible influence in the structure of the sector. One would have liked to see some evidence of new technology emanating from the foreign-owned sector, i.e. developments in the field of dyeing, or new faster carding machines. It is significant that very little came from this direction in the period 1953-1966. This is one of the forms of economic enterprise which at a future re-evaluation of the foreign investment legislation could become the basis of an area of economic activity to be reserved for Greek nationals (as other countries have done in many other fields - see p. 81 above), particularly so as it is not one of the "pioneer industries" importing foreign "know-how" or introducing new technologies. An improvement in the rate of capacity utilisation and the introduction of new management techniques should precede any such action. We note that the capital inflow that had taken place prior to 1966 was to a substantial degree either portfolio participation or of expatriate Greek ownership.

Foreign technology would be more welcome in weaving mills, which were operating with considerable underutilised capacity throughout

(1) The Textile Institute: Management in the Textile Industry. Longmans, London, 1969.
Sidney Pollard: The Genesis of Modern Management. A Study of the Industrial Revolution in Great Britain. E.Arnold, London, 1965.

the period mainly because of high imports of foreign products ("xenophilia" of Greek buyers) or because of genuine price differentials favouring imports, rather than in spinning mills which were in a far better position. The woollen industry, dependent on raw materials from abroad, needed despite the vertical integration which had taken place more technology imports to improve the pattern of production and reduce costs at levels more satisfactory from those of the period before 1966.

C._ The Clothing-Footwear Industry_

The clothing-footwear industry was the smallest in terms of net capital stock both in the beginning and the end of the period 1953-1966.(see Table LVII). The gross domestic product, nevertheless was quite high. The labour input was the second highest in industry (see Table LVIII). Not surprisingly the Q/K ratio was the highest in the industry by a very wide margin. The Q/L ratio was only a little below average. The residual index remained at the same level throughout the period with small fluctuations. This was the lowest residual estimate in the industry.

The material inputs of the clothing-footwear industry are outputs of the textiles and leather industries, which do not produce end products themselves. It was in Greece a traditionally small-scale establishment trade and despite some trend towards larger firms and larger capital expenditures it largely remained one of the least mechanized of all industries in the period before 1966. Only transport equipment, food industries and metal products were less mechanized (see Table LXXIII). There was a small shift in favour of the larger retail bespoke-tailoring firm throughout the period and different tailoring and dress-making firms emerged in the late fifties. Ready-to-wear clothes were introduced very gradually, following the establishment of more selective sizing systems. Men's outwear industries had generally larger establishments than women's.

The <u>apparel industry</u> is likely to remain highly labour-intensive for many years in Greece, as mechanization is hindered by non-standard production and frequent styling changes. Only standardised types of clothing would offer some scope for technological change, but this standardisation was not yet acceptable in Greece of the fifties and early sixties. Equipment and machine attachments as work handling aids (cutting, pressing, sewing machinery) also contributed to increasing speed of production, as did new pattern-making techniques. The design of patterns was important for cutting

pieces that can be machined together with minimum adjustment and trimming. All those cost components in apparel production exist both in factory and out-of-factory production.(1) Their effectiveness was conditioned in Greece by two factors:

a. The skill of individual worker. Employment was increasing in Greece with small changes in the occupational structure and a high degree of female labour participation. Setting technical progress against the general economic background of the industry we see that the transition from a craft to a factory industry was slow and very few large factories existed before the end of the period. Few of the institutional factors favouring production innovations existed. So it was the skill of the individual operatives that was conditioning the cost structure of production.(2)

b. Production planning and layout. A new approach was needed in production and planning: the introduction of light engineering innovations such as the mechanical cloth-shrinkage machines for more accurate cutting, automatic handling of folded cloth (laying-up machines), electric cutters and knives, machine stitching and felling, mechnical test for fault and distortions inspection, better "fixing" process, marking-in process, padding, collar templates and button sewing.(3) Production engineering layout, use of conveyor belts, sectionalisation and time-and-motion studies all depended in the fifties and early sixties on a production and market (demand) structure which simply did not exist in Greece at the time. It is not surprising that in view of the seasonality of the styling range and the frequent shifts of the small-scale production much depended on the (sometimes parochial) craft skills of the fashion designers, in a market where inexpensive quality mass-produced garments were un-

(1) A.P. Zentler and J. Gherson: "Cost Components of Wool Suits", London and Cambridge Economic Service, Vol.29, Bull.3, Aug.1951, p.77 ff. Apparel and Fashion Industries Association: The Present Position of the Apparel and Fashion Industry: A Report, London, 1950, p. 60.

(2) Cf. E.G. Selzer: "Time and Motion Study in the Fashion Wear Industry", Hand's Yearbook of the Clothing Industry, 1952, p. 305.

(3) Margaret Wray: The Women's Outerwear Industry, G. Duckworth, London, 1957, p. 89 ff. The effects of the introduction of such techniques in the English clothing industry are discussed therein.

known. The industry depended more on management techniques, work methods and work distribution than on technology for increased productivity.

The very important footwear industry catered for the Greek market, but had a very creditable export performance by 1966, with a very large increased-export potential in store. Important technical developments were under way by the year 1960. Heel and pattern production factories were established, lining-stitching-press cutting specialisations created, rapid-mulling and leather-softening machines were gradually being introduced. Some of the firms operated outside the Athens area. Much more of course remained to be achieved. Large hydraulically-controlled machines were not widely used, neither was moulding unvulcanised rubber soles introduced.(1) Some structural problems were there. For instance the unequal tariff treatment of firms on imports of capital equipment with those firms established after April 1959 being exempt, was the cause of some consternation with the older established firms which were still liable to the duties. Use of new fabrics was not always easy and styling problems (introduction of buckles etc.) sometimes hindered exports. But overall it was an expanding sector with considerable capacity for further development.

The imported machinery for the clothing industry was mainly of German origin and that for the footwear industry Italian.

SELECTED MAJOR FOREIGN INVESTMENTS

1959	£ 211 416	Socks-Stockings
1962	£ 150 000	Wearing Apparel
1963	£ 200 000	Wearing Apparel
1963	£ 87 000	Underwear
1963-1966	£ 1 000 000	Women's Outwear
1966	£ 160 800	Socks etc.
1966	£ 125 765	Wearing Apparel

Source : See note under foreign investments in food industries above.

The overall share of foreign investment was higher than in other consumer industries or non-metallic minerals and metal products (see

(1) For the latest and more dated developments in shoe technology see respectively :
Kenneth Hudson: Towards Precision Shoemaking. David and Charles, Newton Abbot, 1968, p. 66 ff.
H.A. Silverman: "The Boot and Shoe Industry", H.A. Silverman, Ed., Studies in Industrial Organisation. Methuen, London, 1946, p. 199.

Table LXXV) but larger investments occur mainly in the 1962-66 period. Significantly none was channeled into the footwear industry which was advancing under Greek ownership, after larger industries were established around the year 1960 with a rapidly improving export performance. Foreign technology was required mainly in the clothing sector for the creation of larger modern units, body-measuring surveys, etc. As such it was not forthcoming in the period prior to 1966, when only a handful of firms in all were organized on an industrial basis proper. In the footwear sector, technology inputs are not relevant to new equipment only. Although some shoe factories operated on a modified-line production basis, general industrial systems were not in common use and factories used the rack system for moving material from one operation to another. One important consideration therefore would be time-saving systems, bearing in mind that it took between two and three man hours of labour for most shoes produced at the end of the period. Another field in which expert advice would have helped was the choice among nearly 10,000 machine and tool patents at the end of the period, new drying equipment to allow two shifts a day and even more importantly advice on the coordination with meat production, whose sideline is the production of hides. The industry was often hindered by the fact that hide prices (mostly imported hide prices) were rather volatile, as its production involves definite time sequences and tannery production did not respond to market price fluctuations at the same speed as the hide market. Greek entrepreneurs received little such advice or technical assistance before 1966.

Separate notice should be made of the fur industry, which although technically part of the clothing (apparel) industry, has close affinities with the leather industry. This has been one of the most successful traditional handicraft industries in northern Greece (Kastoria, Siatista). Production was making use of persianer and mink furs in small pieces which were hand-sawn together,(1) and had an output of about $ 15 m. in 1966 increasing at a rate of

(1) Those were mostly imported rugs or scraps of fur.

between 12 and 15 per cent a year, with over half of it channeled to exports. Imports of raw materials accounted for about 45 per cent of the export proceeds. Expansion was in the direction of use of larger stripes of fur in production (rather than small pieces) and of processing those furs in Greece. Technical advice (though not foreign investment) was required in setting up such specialized tanneries and in developing breeding facilities for animals to provide the raw materials (mink furs etc.) locally.

D. The Wood-Furniture Industry

This industry had the highest rate of growth of output (gross domestic product) of all consumer industries (see Table LXIX). The net capital stock had an even higher rate of increase (see Tables LVII and LXX.) so that the Q/K ratio decreased slightly. The labour input was rather stable (Table LVIII) with a rapidly increasing Q/L ratio as a result. The residual factor rose steeply in the four last years, the years of the increased capital outlays and of rather lower labour input. The degree of mechanization was the lowest in the industry after transport equipment and food industries, indicating the handicraft structure of much of the industry (see Table LXXIII).. Foreign investment had a very even share of the industry, the most stable of all sectors throughout the period 1959 to 1966. The level of foreign participation was low-to-average, but not increasing (see Table LXXV).

It has been claimed for the wood industries that the abundant cheap labour delayed the introduction of mechanized production in Greece, particularly outside the capital area. The mechanisation which was observed in the period up to 1960 was reversed subsequently (Table LXXIII). This retrograde development could be explained as manufacturing equipment and processes vary considerably in this branch. Some of the finer grades of furniture, for instance, are often produced entirely by hand labour and some of the cheaper constructions are highly mechanized.(1) A rapid mechanization of the furniture industries to the extent at least that has occurred in some of the more modern concerns in the Athens area had already started taking place with new engineering and programming skills. Most of the innovations in the industry were rather recent and the role of automation was increasing, with conveyancing between processes often seen even in smaller factories.(2) Setting jigs and tem-

(1) Wickham Skinner and David C.D. Rogers: Manufacturing Policy in the Furniture Industry: A Casebook of Major Production Problems. R.D. Irwin, Homewood, Illinois, 1968, p. 4. The occurence of such contradictory developments is discussed in some detail there.

(2) A modern matches plant (also producing ply-wood, hard-board and packing boxes) finished in 1960, was the first mechanised unit outside the furniture sector.

plates on the routers and spindle shaper are other examples. Mechanisation involved greater use of high-speed saws, multipurpose fabricating machines, force-dry ovens, automatic equipment, etc. More rapid diffusion of technological innovations would improve waterproofing techniques, furnacing, use of resin-bonded plywoods, new glues, improvements in finishes and finishing materials.(1)

Increased family formation and disposable income in post-war Greece have resulted in increasingly higher demand for furniture, even if the quality of the product was still low. The rate of growth nevertheless was not one of the highest in the industry and was not expected to increase rapidly mainly because of the heavy dependence of the industry on raw materials from abroad. The long-term project of reafforestation had a long way to go to provide suitable wood at the required quantities. Mechanisation was already in the 1963-1966 period decreasing the physical labour requirements, despite the new jobs emerging requiring lumber and motor coordination and manual dexterity in the place of manual strength. The furniture industry operated on a one-shift basis, the lowest in the industry,(2) although this was an international phenomenon.(3) There was a change in the occupational structure, with a smaller increase in production workers and a greater increase in white-collar employment in the larger firms. The traditional handicraft woodworking skills were simplified by modern machinery, despite the fact that upholstery remained a hand-craft operation. This did not prevent some technological innovations, such as electrostatic spraying, improvement in finishes, or use of plastics to occur even in upholstering: a proof that handicraft operations are often receptive to technological innovations.

The rate of capital expenditures was expected to increase sharply as the furniture works were increasing in size. Not only innova-

(1) Cf. J.L. Oliver: The Development and Structure of the Furniture Industry, Pergamon Press, Oxford, 1966, p. 125 ff.
Dick A. Wood: Plywoods of the World, their Development, Manufacture and Application, Johnston and Bacon, Edinburgh, 1963, p. 3 ff.
(2) See p. above.
(3) Wickham Skinner and David C.D. Rogers: Op. cit., p.5.

tions such as new material-handling equipment or multiple-stage belt sanders in combination with coated abrasives to replace planing or faster assembly operations were expensive if not accompanied by economies of modern mass production techniques, but also the import content of such technologies was high as the equipment was exclusively imported from abroad. Additionally some of the machines required for their operation a high degree of skill and experience[1] and so did many of the new techniques, such as the chemical treatment for wood preservation to reduce maintenance, being therefore costly alternatives. The additional problem of the furniture industry requiring the development of new functional designs in a suitable Greek style which had not evolved yet in the period under consideration.

Foreign investment at a fairly low key came mainly at the middle or the end of the period and the largest firms are indicated below.

SELECTED MAJOR FOREIGN INVESTMENTS

1958-1959	$ 1 040 000	Plywood Industry
1959-1964	$ 1 647 032	Wood-Formaica
1962-1966	$ 200 000	Plywood Industry
1963-1964	$ 500 000	Planks-Boards
1964-1966	$ 148 675	Furniture

Source : See note under foreign investments in food industries above.

Foreign participation at the total sector level was average at the middle of the period and average-low at the end of the period. Equipment for the industry was mainly imported from Italy, Sweden and Eastern Europe. Only simple saws and planes were made locally.

Foreign technology is required not so much in construction of wooden containers and boxes or wooden floors or fibre-boards, but rather in the plywood-veneer-blockboards sector and the construction of window-shutters and doors where standardization would help decrease the excessive fragmentation in handicraft establishments.

(1) Cf. U.S. Department of Labour: Technological Trends in Major American Industries, Bulletin No.1474, Washington D.C., February 1966, p. 39 ff. In Greece this fact perhaps explains the very high wage rate by the end of the period (Table) and the high labour income share.

E. The Paper-Printing Industry

The paper and printing industries form a group of non-homogeneous activities with a rather average rate of increase of output in the period 1953-1966. The bias in the technical advance was almost entirely capital-saving (see Table LXXVI) in contrast with many other industries. The technology index itself (residual factor) was increasing only moderately, at about the rate of textiles and higher only than clothing-footwear and non-metallic minerals. The degree of mechanization, nevertheless, was increasing much more rapidly than in those other industries (see Table LXXIII). This could possibly be linked to the fact that large-scale industries (better able to afford purchases of expensive equipment) were predominant by 1966, employing about 6,700 out of just over 7,000 employees in the paper industry and rather less in printing. Foreign capital participation was at a rather high level in 1960, but declined both in absolute terms by 1966 (percentagewise) and in relative terms as foreign participation in other industries increased to a higher level by 1966.

The paper industry internationally is generally expected to be research-oriented not only in terms of economical manufacturing methods and of better quality and new products, but also in terms of additional sources of raw materials. The need of importation of raw materials such as pulpwood, straw, or waste paper has obviously been a serious obstacle in the expansion of the Greek firms.(1) Imports of paper covered over one-quarter of consumption at the end of the period (excluding newspaper-print) and local production the rest, but with the exception of small quantities of straw the entire quantity of paper-pulp used as raw material in production was imported. So was the entire quantity of newspaper print. The latter was not surprising as it required a much larger market to sustain a newspaper-print industry. We note nevertheless, that despite the presum-

(1) The straw-cellulose plant in Larissa (in conjunction with a paper mill) increasingly used local raw-material input for pulp in its operations from 1964 on.

ption in favour of the view that this industry operates most efficiently on a large scale,[1] the available evidence on returns to scale shows constant returns.[2] This could be because the increasing returns apply mainly to pulp mills and newsprint plants which did not figure in the sample tested as none existed at that time.

Another controversy generated by our findings is the existence of a capital-saving technical change together with an observed increasing mechanization in the sector. This could be explained in terms of such significant changes, as could be expected to take place with an increase in the number of machine operators. Given the new handling techniques and the extensive instrumentation, an increasing proportion of the workers was becoming semi-skilled or skilled in terms of labour skill-code so that the technology employed was gradually becoming labour-using.[3]

Automation is the most important innovation in this sector, particularly in the process of preparation of stock without use of beaters. Machines in series now subject the stock to the treatment.[4] The procedure involves preparation of pulpwood and then use of either the sulphate process (cooking: high digesting temperatures; washing: use of filters; chemical recovery and liquor preparation), or the sulphite process (calcium-bisulphate acid). The ammonium and magnesium bisulphate process has never been used in Greece. Pulp bleaching then follows. If softwood is scarce (as in Greece) the semi-chemical batch-cooking method is preferable. If straw pulp is used, as was in Greece right after the end of the period, use of grinders and grindstones is made together with cylinder mould machines and other finishing equipment.[5] All were expensive alternatives and given the

(1) U.N. I.D.O., Vienna: Estimation of Managerial and Technical Personnel Requirements in Selected Industries. Training for Industry Series No.2, New York, 1968, p. 83.
(2) A. Koutsoyiannis-Kokkova: Op. cit., 1964, p. 157.
(3) R. Sato and M.J. Beckman: Op. cit., 1968, p. 59 ff.
M.J. Beckman and R. Sato: Op. cit., 1969, p. 89 ff.
(4) Cf. O.E.C.D.: The Pulp and Paper Industry in the USA, Report by a mission of European experts, Paris, pp. 73-4.
(5) Cf.: U.S. Dept. of Labor: Op. cit., 1966, p. 161.

raw materials shortage in Greece technical know-how from abroad was necessary, long before foreign investments were considered as a possibility. Such expert advice came only after the end of the period from the U.N. Development Programme on paper-pulp and newsprint. No comparable services were sought or offered before 1966.

We notice as a last point that the increased mechanization was accompanied in the last four years by a decreasing rate of utilisation of capacity from 52% in 1962 to 39% in 1966. Of course the estimate covers the printing industry sector as well, but it is significant because on the paper industry side we record the destruction by fire in 1963 of the largest factory in the country (Athinaiki Chartopiia) with an invested capital stock of over 200 m. drachmas. This ought in the short term to have improved the capacity utilisation of the remaining firms. It is probable in this instance that the capacity index described on p. 202 ff. above has interpreted the drop in output as a drop in utilised capacity, when the capacity itself was extinguished in this case. It is unfortunate that it has not been possible to obtain micro-data at the firm level to effect corrections in this instance.

The <u>printing-publishing industry</u> showed a generally low level of productivity both in the composing room and at the bindery process. The printing industry in the fifties and early sixties was still far behind many other industries in the nature of equipment and the expectations for new plant and machinery were rising very slowly. There was a marked reluctance from the part of old firms to replace old but serviceable equipment. A celebrated example of this trend was the Athens daily "ESTIA" which still uses equipment dating from before the world war, the first that is not the second, in their even earlier, nineteenth century premises, to produce a technically impecoable edition. Larger concerns of course have modernised extensively and were mechanised and automated at the end of the period. This produced a situation of relatively small increases in employment, but of changing skill and new job requirements.

Faster printing presses, offset lithography, gravure printing and type-setting were enormously improved and lithographic printing was popular with small and medium size firms. There existed an increasing number of "private" presses in addition to "trade" printers. New line-composing machines (linotype) were used for the press and other quick-process undertakings. Letterpress, intaglio and development of "silkscreen" process printing were yet to be fully developed. There was an ever increasing use of colour since the early introduction of offset-lithographic processes.

There were two main disadvantages with the new processes. First that little of the supply in rollers, cylinders, machinery and equipment, presses, proofing presses, cutters, stibhers, collators, process cameras etc. were produced in Greece and neither were spares for them. Even ancillaries for production, supply and reconditioning of type-metal, were all imported from abroad. The expansion of the industry was therefore constrained by balance of payments considerations. Additionally the equipment was far more expensive to buy or service for the individual entrepreneurs. Second that the adoption of more automated processes was not always more economical as the balance between production sequences was maintained at an optimum only rarely. New machines were faster running, but the length of "runs" was small and there was always the danger of a decline rather than an improvement in productivity. This nevertheless was an international phenomenon[1] and not something to occur in the Greek industry alone.

The printing industry is one where management plays an important role, more so perhaps than in most other industries. The main core of the industry, nevertheless, has been the jobbing printer using either letterpress or lithographic methods.[2] The question of management was particularly important in the newspaper sector in

(1) Cf. Allan Delafons: The Structure of Printing Industry. Macdonald, London, 1965, p. 81 ff.
F.A. Wells: Productivity in a Printing Industry. G. Duckworth, London, 1958, p. 47.

(2) Cyril Spector: Management in the Printing Industry. Longmans, London, 1967, p. 4.

Greece with the new developments which took place in the period such as the introduction of web-fed offset rotary printing and photocomposing. No computer type-setting was introduced in Greece as was in more advanced countries near the end of the period,(1) but the introduction of offset printing for colour in some of the largest establishments made the presses more reliable, increased the plate life and was causing less wear. New dampening and drying techniques were also introduced.

Foreign investment in the paper and printing industry was confined in the period 1953-1966 mainly in the paper manufacture sector. Investments spread throughout the period (more so than in any other sector of the industry: a more even flow of capital is observed here than in other activities), but the foreign sector did not retain their share of the market. A small fall is observed during the last few years, despite a high inflow in the year 1964. Ignoring the smaller entries I present the large transfers below.

SELECTED MAJOR FOREIGN INVESTMENTS

1954-1955	£ 1 030 000	Pulp and Paper
1955-1956	£ 1 030 000	Pulp and Paper
1956-1957	£ 350 000	Pulp and Paper
1958	£ 156 000	Paper Making - Paper Bags
1958-1966	£ 374 607	Card Board
1960	£ 250 000	Card Board
1960	£ 850 000	High-Finish Fine Paper
1960-1963	£ 3 750 000	Paper Pulp
1962	£ 163 000	Aluminium Foil Printing
1962	£ 100 500	Printing
1963	£ 55 000	Paper Containers
1964	£ 220 000	Paper-Bags
1966	£ 68 434	Paper Containers

Source : See note under foreign investments in food industries above.

Foreign technology was indispensable not only in the form of machinery but also in programming new activities and exploiting new markets and new paper products such as tissues, reeled paper, high surface-finish paper, sanitary papers, containers and wrapping materials. Most of this know-how was transferred through licence agreements, or by private agreements.

(1) John Goulden: Newspaper Management. Heinemann, London, 1967, p. 71 ff.

F. The Leather-Rubber-Plastics-Chemicals-Petrol Industry

This large and important group of industries showed a very considerable increase in output during the period 1953-1966. In fact the industry was operating at a very low level in 1953, so that it is fair to say that during this period the industry started functioning on a normal industrial basis. The increase in capital stock was very considerable, although not as steep as in some of the other branches. The labour input increased mainly in the four last years. The increase in capital stock was accompanied by a qualitative change as the share of machinery increased considerably, although nowhere near the increase in mechanization in textiles, which was the highest in the manufacturing sector. The initially high share of capital in income decreased in later years. The residual factor increased more than in any other industry. The increases came in two spurts: one in the 1959-61 period and one in the last two years, with rather smaller increase inbetween. The initially labour-saving bias in technical advance becomes neutral with small fluctuations in one or the other direction later on.

The five component groups of industries within the branch have to be viewed individually as they cover essentially different lines of activities. The connecting bond is the use of chemical processes in production. The old alchemists' dream of transmuting base metals to gold was largely responsible for much new chemical knowledge in early chemical developments and by transmuting the chemical nature of material inputs today the industry develops tradeable commodities and substances often as valuable as gold.

The leather and fur industry is a very old craft which transforms hides or skins by means of chemical processes. The industry does not necessarily require massive plants or extensive equipment.(1) It can produce economically on a small-scale basis as well. The type of equipment required is not complex in structure and is rather standardized, to the extent that guaranteed reconditioned installations are sometimes recommended to reduce costs. Such equipment includes

(1) U.N. I.D.O.: Estimation etc., Op. cit., 1968, p. 147.

tanks for chemicals where hides and skins are treated, piping and pumps (normally made of bronze or brass), vats or paddle wheels for the beamhouse (usually made of wood) and cylinder machines equipped with blunt knives in staggered form (fleshing machines) to remove flesh and give the skin uniform thickness, rockers to diffuse the tanning agents evenly, revolving tanning drums and wringing and setting machines: equipment that could eventually be produced in Greece.

In an industry where production processes, equipment and end-products vary so very considerably, managerial competence and control efficiency are of great importance and I note that in Turkey and Egypt special training centres exist in the leather branch, of the sort that were not available in Greece. Improvements could be made in the processing of hides from small rather than large animals (goats, kids, lambs) useful for high-cost or high-fashion shoes. And technical advice should be directed to encouraging a more widespread use of the more modern chrome-tanning method (particularly for higher-quality skins) in the place of the traditional vegetable (quebracho) tanning method, now mainly used for sole leathers and industrial belts.

Rubber manufacturing in Greece started with small inflows of foreign capital in 1959 for the manufacture of various rubber products and expanded considerably after 1961 when a fairly large rubber industry was established by an Italian tyre manufacturer. The uses of rubber products in the economy are quite diversified and in this lies the high interindustry-relations importance of the rubber industry. It provides not only components and spares to the motor industry, but also to a number of other activities. The line of demarkation for instance between rubber and leather is becoming increasingly blurred in the footwear industry with rubber footwear, sponge rubber soling and high pressure processes to mould. The tyre industry itself receives a large number of inputs from other industries: cords from cotton mills, steel cords and rayon cords. New variants as latex rubber used for foam rubber are made by centrifuging methods of production and are used for toys, elastic thread,

proofing in continuous layer, bonding, etc.[1] Industrial belting, conveyers, rubber hoses and upholstery are heavily dependent on the rubber industry, which also provides for rubber flooring material, hard vulcanite rubber (ebonite) and rubber adhesives.

Rubber technology uses a lot more equipment than the leather processes, with rubber mixers, automatic loading machines, calenders and hydraulic presses with heating and cooling platens.[2] It is mechanized to a higher extent and plant construction is much more costly.

Developments in rubber compounding were also rapid, with new techniques of vulcanisation, use of carbon black reinforcing agents (using oil-refinery by-products) and of other agents (silicas, etc.) for bright colours. Cyclised rubber is used for shoe soling and a large number of chemically modified rubbers and derivatives (employing organic accelerators of vulcanisation, e.g. aniline) are used throughout the industry, usually synthetic "cold rubbers" polymerised in low temperatures.

Considerable imports of rubber products at the end of the period led to the expansion of investments by an American tyre company after 1966, but clearly the industry required supplier units to be developed for raw materials and other chemical inputs which were often imported not only before 1966 but for a long period afterwards as well. The difficulty in obtaining the required technological advice, backed up by up to date research and development in a branch operating in international oligopoly conditions, made this dependence on foreign firms unavoidable in this particular sector. Expansion was possible, nevertheless, in the number of small and medium specialised firms producing a great variety of rubber products for internal consumption or for use in the industry.

The synthetic materials industry consists mainly of three areas of manufacturing: synthetic rubbers (of which we have seen above), plastics and man-made fibres. Those activites of varying economic

(1) Audrey G. Donnithorne: British Rubber Manufacturing: An Economic Study of Innovations, Duckworth, London, 1958, p. 21 ff.
(2) National Economic Development Office: Conference for the Rubber Industry, Rubber Economic Development Committee, London, 1967, p.25.

proofing in continuous layer, bonding, etc.[1] Industrial belting, conveyers, rubber hoses and upholstery are heavily dependent on the rubber industry, which also provides for rubber flooring material, hard vulcanite rubber (ebonite) and rubber adhesives.

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(2) National Economic Development Office: Conference for the Rubber Industry, Rubber Economic Development Committee, London, 1967, p.25.

significance and uses were related chemically and their manufacturing process did not involve assembly lines or moving machinery, but tanks, pipes, vats and largely high polymer materials. Monopoly (monopolistic competition) or oligopoly is the rule, competition the exception (mainly in the production and moulding of plastic items). This group of industries is in competition with related activities: plastics often have to compete against aluminium and man-made fibres against wool and cotton production.(1)

For an integrated plastics industry developments in synthetic resins and in plastics processing resulting in new resins and reduction of costs of new processes are very important. In general innovations took place mainly in the labs of established firms of industrially more advanced economies,(2) so it is not surprising that lacking research facilities of their own the small Greek firms had to forego independent research and follow an imitating route through licencing under royalties incentive or through foreign subsidiaries, in an effort to shorten the imitation lag. The innovations which had to be brought in from abroad were mostly in the shape of processing improvements, with changes in the continuous-operation equipment and new combinations of molding and forming techniques. With an expected high rate of expansion of output (one of the highest in all industry) the importance of a high-precision mould-making industry was becoming obvious at the end of the period, but unfortunately the level of consumption was not high enough to support such an industry in the early sixties. The Greek firms had to rely on foreign technology for improvements in toughness of the plastics used, in their insulating properties, resistance to chemicals, reduced-weight properties and ease of fabrication.

The first plastics processing concerns using early thermosetting resins in the late fifties, were small moulding enterprises, using cheap compression moulding machines. Little investment was required in extensive plant or costly equipment. There was no mass

(1) G.C. Hufbauer: Synthetic Materials and the Theory of International Trade. Duckworth, London, 1966.
(2) E. Mansfield: "Size of Firm, Market Structure and Innovation", Journal of Political Economy. December 1963.

production, but not excessively high labour costs either. In the sixties more modern thermoplastic resins were increasingly used, being easy to process and requiring relatively cheap machines. The industry was relatively labour intensive, although no specialised skills were required which would inflate the wage bill. A "cottage industry" structure characterised the industry.(1) The industry produced an increasing number of important industrial-electrical parts previously imported, agricultural pipes and sewers and a large number of consumer goods of numerous civil applications.(2)

The man-made-fibres section comes under the chemical industries, having either a cellulose base (viscose rayon yarn, staple fibres), or a non-cellulose fibre structure (nylon-polyester). The textile class of fibres includes acid and fire-proof cloth, tapestries, etc. As far as the technology employed is concerned, the man-made-fibres industry is a branch of the chemical industries, but it also uses textile processes. The first units of some size were to produce rayon fibres, and was after the end of our period to cover over three-quarters of local demand. Next(but again established after the end of our period)was production of nylon to cover the local market and export part of the produce. Acrylic and polyester fibres were all imported during the pre-1966 period and would continue so for a long period afterwards. In conclusion little of the local demand in man-made fibres was covered by local production prior to 1966, with the exception of rayon yarn used by silk manufacturers.

(1) U.N. I.D.O., Vienna: Studies in the Development of Plastics Industries, Monograph No.4, New York, 1969, p. 8.

(2) The first plastics raw materials to be produced in Greece were polysterine and P.V.C. Small quantities were produced before 1966 and imports covered a large share of demand. The expansion in petrol industries at the end of our period allowed the expansion in the two mentioned materials, but clearly a third distillery was required before production of ethylene, styrene, polyethylene, propylene, etc. could be contemplated. In that case ethal production could be started to provide for the rubber industry and methanol to give formole for plastics and glues. It is unfortunate that the industrial infrastructure of the country before 1966 would not allow such an expansion and the market would never have been able to absorb it.

And yet man-made fibres could develop quite substantially on a selective basis. The viscose industry (viscose rayon) is linked as far as raw materials are concerned with the timber industry for wood pulp. In Greece this was a disadvantage, given the general shortage of supply and the high prices. But the basis of the industry is scientific, innovations are constant and new techniques render the wood cost constituent of the price of pulp a relatively small share of all costs.(1) With rising international prices due to processing costs a careful exploitation of the country's forest wealth (given an expanded reafforestation policy) would allow a restructured wood industry to produce the raw materials locally.

For synthesised polymer synthetic fibres on the other hand (nylon, terylene, etc.) the primary raw materials are coal, petroleum and salts.(2) The processing costs include fuel and power, but clearly the expansion potential is a lot higher here.

The chemical products branch of the industry has rightly been thought of as one of the most powerful agents of economic growth. It certainly expanded in Greece at a rate quicker than that of the average manufacturing activities. There was low labour intensity in the industry, which was a small employer of skilled labour. It required by contrast a high ratio of technical and professional manpower. A survey for another developing country (Peru) in the late sixties,(3) gives the skilled labour content of total employed labour force as follows:

Chemical Industries	15%
Metal Manufacture and Machinery	25%
Textiles	30-40%
Furniture Industries	50%
Apparel Industries	80%

The claim though for growth-generating potential of the industry is not based on the absence of manpower constraints, but rather on the

(1) O.E.C.D.: Man-Made Fibres: Production, Consumption and Capacity. Paris, 1969, p. 5 ff.
(2) Douglas C. Hague: The Economics of Man-Made Fibres, Duckworth, London, 1957, p. 294 ff.
(3) U.N. I.D.O.: Techniques of Sectoral Economic Planning: The Chemical Industries, Monograph No.17, New York, 1970.

technological characteristics of the industry. There are strong interindustry linkages as joint products are developed and a large number of by-products are used again, making the intra-industry flows very important.

In Greece at the first stage of post-war industrialisation simple processing technologies were developed, which imported their more sophisticated components from abroad and doing only limited repair and maintenance work. The production equipment and machinery itself was short lived by nature and in need of frequent replacement. In more recent plants equipment is more durable. The average lifetime of plant and equipment in basic chemical industries is given as 12.5 years.(1) Data are not available for basic chemical industries alone in Greece before 1963, but the pattern of investment since then gives an only slightly higher average, given the National Accounts depreciation rates. The proportion of repairs and replacement work carried out by Greek metalworking or glass industries should be expected to rise. Imported technology could be combined with elements of Greek-generated technology, not as joint ventures, but as complementary activities, with local research focused on special processes.

Further backward integration of firms with wide ranges of chemical end-products had not materialized in Greece during the period we consider, much less integration of diversified industries. There simply was no diversified heavy industrial base in the fifties and early sixties for backward integration to be a practical proposition. Imported technology took the form of licensing, patents and training abroad of technical personnel, rather than importing foreign experts. It is an open question whether the rate of diffusion of know-how and the rate of technical change increased more under this arrangement. Few joint ventures (portfolio investments) were succesful in bringing Greek entrepreneurs into ventures they would not otherwise undertake.

(1) U.N. I.D.O., Vienna: Chemical Industry, Monograph No.8, New York, 1969, p. 38. The same reference is cited on p.36, in footnote (3), p. above.

Chemical fertilisers were a special case in the development of the chemical industries, as it was linked to the projected re-organisation of the agricultural production. The rate of increase in the use of fertilisers was of the order of 10 per cent annually and any readjustment of cultivations would require changes in the nature of cultivated land which would increase this consumption. In 1960, 60 per cent of domestic needs were covered by imports. Soon afterwards the Ptolemais nitrogenous fertilisers factory (exploiting the available lignite deposits) covered the local demand. Superphosphate fertilisers were also produced but an expansion there and in potasium fertilisers could be anticipated. The need of sulphuric acid for the fertilizer industry required an expansion in the production of pyrites, following an initial increase in imports of sulphur.(1)

We have mentioned the fact that the basic chemical industry was generally inadequate and was suffering from diseconomies of small-scale production, relience on world markets for raw materials and semi-finished products, or protectionist policies to remain competitive behind tariff walls. This can best be seen in some related industries, like the pharmaceutical and agricultural drugs industry. Pharmaceuticals rely on high expenditure on research, which itself is an important reason for the emergence of large international firms dominating the markets. The lengthy gestation periods required for research investment in the life-cycle of innovation have been calculated as follows(2)

To completion of feasibility studies		weeks to years
To completion of laboratory research		2 - 3 years
To completion of clinical research		2 - 3 years
Introduction to maximisation of profits	average	5 - 6 years
	maximum	16 years

(1) The very extensive bibliography on the fertilisers industry is restricted here to the following basic issues
O.E.C.D.: Supply and Demand Prospects for Fertilisers in Developing Countries. Paris, 1968, p. 70.
U.N. I.D.O., Vienna: Factors Inhibiting the Indigenous Growth of the Fertilizer Industry in Developing Countries, ID/13, New York, 1969.
U.N. I.D.O., Vienna: Fertilizer Industry, Monograph 6, New York, 1969, p.12.

(2 C.R.B. Williamson: "Exporting Pharmaceuticals", G.Teeling-Smith, Innovation and the Balance of Payments: The Experience of the Pharmaceutical Industry, Office of Health Economics, London, 1967, p.3.

A research budget can not conceivably be varied in the allocation of funds at short notice[1] as the shaky finances of Greek concerns would require, let alone that no Greek pharmaceutical firm could afford to acquire an up-to-date laboratory or to pay for creative research scientists. It is obvious that the pharmaceutical industry in Greece during this period was a group of mostly medium-to-small-size firms making various preparations under licence, for packaging and distribution at non-competitive prices, covered by a protective customs regime. Agricultural pesticides and drugs were mainly imported from abroad. The gestation period for agricultural research is also fairly long and in adapting foreign technologies Greek firms would have the obvious disadvantage of diseconomies of scale.

The capital investment involved in the construction of an oil refinery was not really worth undertaking in the middle sixties, unless a market existed to absorb a range of products totaling up to 3 m. tons a year.[2] The technical problems involved centred on issues of specialized petroleum engineering and the advancement in technology mostly involved issues of product innovation; process innovation was not significant in this sector.

The technology employed is very capital-intensive, given the adaptability of oil to continuous automatically controlled processing. The process plant has low running costs but high overheads. One can expect increasing returns to scale up to capacity limit.[3] The distillation of crude oil can follow one of three processes: crude distillation (boiling off the different fractions), cracking process (separating components by solvent extraction, i.e. breaking the molecular structure up into lighter structures), or reforming process (converting low-octane petrol into higher grades by chemical transformation). The Greek refineries operated using the method of naphtha cracking (thermoproduction).

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(1) G.J. Wilkins: "A Record of Innovation and Exports", G.Teeling-Smith, Op.cit., 1967, p. 16.
(2) Christofer Tugendhat: Oil: The Biggest Business, Eyre and Spottiswoode, London, 1968, p. 191.
(3) Cf. J.E. Hartshorn: Oil Companies and Governments, Faber and Faber, London, 1962, p. 66 ff.

The original agreement with the capital importing ESSO company for the establishment of the Thessaloniki refinery provided for monopoly production of 29 chemical products in their integrated petrochemicals factory for a period of time. The number was later renegotiated and reduced to 9 products, including ethylene, tetramethyl lead, ethyl chloride, ethylene dichloride, vinyl chloride, polyvinyl chloride, polyvinyl acetate, haxane and aliphatic solvents. It was part of the deal that technical processes involved and any improvements in technology, were not to be developed in Greece or otherwise generated in the Greek segment of the firm, but would be brought in by the international company which controlled the operations, commanding world-wide operations and extensive research facilities.

The first (state) oil refinery in Aspropyrgos had a production capacity of 1.84 m. tons crude oil, but was later expanded to 2.3 m. tons near the very end of our period, when the second ESSO refinery was established in Thessaloniki, of a capacity of 2.5 m. tons, bringing the total to 4.4. m. tons in all.

Foreign investment in the Leather-Rubber-Plastics-Chemicals-Petrol group of industries was relatively low in the fifties, but increased after 1966. In the last four years this increase became extremely steep, with the foreign-owned sector controlling in 1966 over half the existing net capital stock (Table LXXV). Little was invested in leather industries and perhaps less than one could expect in basic chemical industries. Rubber, plastics and particularly petrol on the other hand all had very high shares of foreign participation. The size of foreign investments ranges from medium-small all the way up to large (monopolistic-competition-size), with no discernible pattern. The largest concerns after the two petrol industries were two Greek-owned fertilizer factories.

SELECTED MAJOR FOREIGN INVESTMENTS

1956	£ 399 915	Gas Fuels
1956	£ 208 900	Resin Processing
1956	£ 316 574	Gas Fuels
1958	£ 148 304	Man-Made Fibres
1959	£ 120 000	Rubber Products
1959-1962	£ 106 872	Rubber Tyres
1959-1964	£ 154 000	Paints etc.
1960	£ 600 000	Antibiotics
1960-1961	£ 1 186 000	Gas Bottling
1960-1962	£ 700 000	Sulphur Industry
1960-1963	£ 1 600 000	Polysterine
1961-1964	£ 175 000	Cosmetics
1961-1965	£ 23 000 000	Sulphur Phosphate
1961-1966	£ 10 277 623	Rubber Industry
1962	£ 850 000	Chemicals
1962-1966	£ 78 600 000	Petrol Refineries - Petrochemicals
1962-1966	£ 15 500 000	Chemicals
1962-1966	£ 1 870 000	Organic Fertilizers
1962-1966	£ 12 500 000	Nitrogen Fertilizers
1963	£ 2 727 853	Detergents
1963	£ 150 000	Colours
1963	£ 120 000	Pharmaceuticals
1963-1965	£ 210 000	Compressed Gases
1964	£ 250 000	Fire-Fighting Agents
1964	£ 1 657 660	Ammonia etc.
1964	£ 2 000 000	Petrol Industries
1964-1966	£ 11 000 000	Vinyl (Chlor.)
1964-1966	£ 975 632	Petrol Products
1964-1966	£ 140 000	Pharmaceuticals
1966	£ 1 000 000	Petrol Products
1966	£ 375 000	Plastics
1966	£ 250 000	Fertilizers

Source : See note under foreign investments in food industries above.

The major technical challenge was to come with the establishment of a caustic soda-chlorine industrial complex in Messolonghi, with the decline in productivity in natural resin products industries (turpantine, colophony), with the development of raw materials for the paints industry,(1) and with the seemingly unending import-substitution requirements in pharmaceuticals (including agricultural drugs). Synthetic rubber and petrochemicals (including plastics and man-made fibres) would then follow in a second stage of expansion.

(1) Technical cooperation of Chropi with I.C.I. helped in introducing paints of British Stand in Greek production after the end of the period and Vivechrom in cooperation with British Paints Ltd. introduced quality ship paints and in cooperation with Dr.A.Candolt A.G. of Switzerland a variety of inks.

C. The Non-metallic Minerals Industry

This industry shows a very considerable in increase in output in the 1953-1966 period and an even larger increase in invested stock, with a resulting decrease in the Q/K ratio (Table LXX). This increase was largely brought about and sustained by the expansion in building activities in the country (houses, stores, factories, public works). It was also considerably increased by the unavailability of alternative building materials at that time, such as steel, plastics, wood, etc., to be used in mass quantities as substitutes. The expansion in glass, clay, china and porcelain output on the other hand was conditioned by consumer demand, itself a function of increasing incomes.

The high degree of new net capital formation in the branch did not bring about any considerable changes in the structure of the stock and the share of machinery remained more or less the same. The capital stock, nevertheless, was at the end of the period utilized at a higher degree than than previously (Table LXVIII). The share of capital in income remained at substantially the same level, with a decline around the 1961-1963 period. The very considerably increased productivity of labour (Table LXX) is seen in conjunction with a rather consistent labour-saving bias in the technical advance. The average daily wage (basic) in the industry was by some margin the highest of all sectors of industry throughout the period, which could partly explain the labour-saving bias in technology.

The technology index itself (residual factor) actually showed a decline for much of the time, with increases in the later half of the period (more substantial in the last two periods) to bring the level nearer that of the food industries. It was the lowest residual index in this period with the exception of that in clothing industries. Technological factors have also contributed to a structure of industry that was quite polarised. In some industries (cement, glass) production was carried out

by relatively large plants. A large number of handicraft establishments on the other hand, are found in other activities, such as gypsum, asbestos, bricks, plaster products and pottery. Some establishments in those sub-sectors were growing to medium-size at the end of the period to fill in the gap in the range of sizes of firms.

The cement industry was easily the most important of all component sectors, both in terms of level of output and in terms of importance of contribution to the reconstruction of the country after the war. One characteristic of the industry was the relative longlevity of the plants, requiring high capital outlays per unit of output. The processes of production have changed with the introduction of flotation to replace the first rotary kilns in blending natural raw materials (chalk or lime-stone). Instrumentation is very important in controlling the mixture, so that the technical advances mainly came in extensive complex instrumentation. Computer control, first introduced in the United States about 1962,(1) was not used in the Greek process system to date.

Changes in distribution and bulk movements were as important as new uses of the product (prestressed concretes, soil cement-paving, thin shell roofs and lightweight concretes) and higher efficiency requirements of the kilns, in bringing about the higher rate of capacity utilisation to provide for an increasing demand, even if this demand was subjuect to seasonal variations. Significantly the full requirements of the industry were not expected to rise, although the maintenance costs were rising very quickly, in part because of the absence of qualified engineering firms needed to service the kilns and produce ancillary equipment. The new jobs included specialised consol room technicians and instumentation experts.(2) Big storage silos were also required of a capacity of over 1,000 tons.

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(1) U.S. Dept. of Labour: Op. cit., 1966, p. 57.
(2) Cf. B.R. Williams: "The Building Materials Industry", D. Burns, Ed., Op. cit., Vol.I, 1961, p. 321 ff.

The development of the bricks industry depends on the availability of clays suitable for bricks. It is an ancient craft, depending on the knowledge on the behaviour of raw materials.(1) There was a high disparity in the size and age of plants, their methods and costs, the extent of technical knowledge and the degree of mechanization. The equipment includes crushing, grinding and shaping machines for clay preparation, although the same bricks are made elsewhere by hand, and machinery is used only for harder clays or shale. There were important differences in practice in firing and drying, some of the more up-to-date yards using tunnel dryers or hot-floor drying. There were no modern management techniques or training facilities and in view of the increasing demand for new materials standardization and customer-specification were becoming necessary at the end of the fifties.

The brick industry brings into relief the importance of new techniques of quarrying. The same applies to other activities with links to the construction activity, such as the concrete, gypsum, asbestos and plaster products. Use of ready-mixed concrete, replacing concrete prepared at the construction site was rare before 1966, but was expected to increase considerably with economies of scale in production. The demand for refractory materials depended on the expansion of heavy industries, and a new asbestos mine in the early sixties provided material for asbestos-cement construction products. Caustic and dead burnt magnesia were increasingly exported in the last few years of our period.

Glass was not widely produced in Greece, although the raw materials were all available (clays, gypsum, sand, limestone, concrete aggregates). Sheet glass required a great concentration of production and the cement-and-glass process requires high temperatures, high capital costs and intensive three-shift operation, although most workers have to be at the semi-skilled level only. Glass containers on the other hand had new products

(1) Cf. B.R. Williams: "The Building Industry", Duncan Burn, Ed., The Structure of British Industry, Vol.I, Cambridge University Press, 1961, p. 338 ff. Notice important (and a little suprising) similarities in the structure of the British and the Greek bricks industry.

and new colouring processes introduced and also new techniques of labelling to enhance marketing appeal. The firms did not have the high degree of automation required in packaging and handling operations, but with the development of the beverage and chemicals-pharmaceutical industries a large expansion was planned in glassworks of annual capacity of 25,000 tons of glass products (three quarters of internal consumption).

Pottery had the greatest of all handicraft traditions in Greece from very ancient times. The changeover from coal-fired ovens to continuous tunnel ovens fired by electricity or oil where the ware is carried through on a belt or truck was not widespread yet and a number of innovations such as forced air circulation were not yet introduced to a great number of concerns. Not surprisingly the firing cost variations were very large.(1) The main reason why continuous operation was not introduced was, in this author's opinion, the fact that underutilised capacity in such activities drastically reduces the cost advantage of a continuous operation. The low level of management was perhaps an additional reason. The equipment was quite durable though with low depreciation rates.

The domestic ware sector of the industry was by far the largest, comprising mainly of ordinary consumer products. Storage, warehousing, packaging and transport costs were high and fuel requirements in Greece were costlier than in other European countries.(2) Some standardization of production was also desirable, particularly in the production of the tiles sector. The strength of the small firms that constituted the industry was primarily their flexibility and the close personal contact of those employed.

The largest foreign investments in the branch concentrated in the second half of the period, came mainly in porcelain products and cement, with

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(1) Cf. B.R. Williams: "The Pottery Industry", D.Burn, Ed., Op.cit., Vol.I, p. 309 ff.

(2) Cf. D.J. Machin and R.L. Smyth: The British Pottery Industry, 1935-1968, Dept. of Economics, University of Keele, 1969, p. 41 ff.

SELECTED MAJOR FOREIGN INVESTMENTS

1958-1960	$ 1 000 000	Cement Products
1960	$ 238 746	Baryte Processing
1961-1962	$ 350 000	Concrete - Cement Products
1962-1964	$ 410 000	Porcelain
1963	$ 308 500	Ceramics
1963	$ 150 000	Porcelain
1963-1964	$ 270 000	Porcelain
1963-1965	$ 769 900	Porcelain
1964	$ 225 000	Construction Tiles
1964	$ 270 000	Steatite Cement
1964	$ 1 000 000	Cement
1965-1966	$ 350 000	Porcelain - Glass Items
1965-1966	$ 1 534 363	Cement
1966	$ 3 500 000	Cement
1966	$ 6 000 000	Cement

Source : See note under foreign investments in food industries above.

the overall share of foreign investors being small, in all but the last year, 1966 (Table LXXV). The capital equipment imported for Greek investments was mainly of Italian origin. A few of the brick-making machines and ancillaries had started being manufactured in Greece before 1966.

Cement in Greece is known to account for about 0.5 - 5.0% of the overall investment in buildings and plant. Technical advice was required in introducing high-endurance Portland cement, and in producing white cement, plastering cement and various decorating varieties. The prefabricated constructions industry, although operating for some years, was badly in need of standardisation, not only in terms of types of buildings to have official approval, but also in terms of standardised construction and insulation units. With tiles the main problem was not so much the construction of new items (French and Byzantine tiles and bricks of all kinds, insulating or not, floor tiles, clay-silicon pipes and innumerable other products were already manufactured), but the methods and network of distribution and transport. Organisational methods needed improvement here. In the glass industry, by contrast, new technology was needed for the introduction of tinted, reinforced, security, translucent and rough-surfaced cut glass, to provide for a rapidly increasing market.

H. The Basic Metal Industries

The basic metal industries had the greatest rate of increase of output of all sectors of the manufacturing industry in the period 1953-1966. This expansion was accompanied by the largest increase in capital stock of all. The Q/K ratio actually declined a little, but the Q/L ratio increased more than ten times in the period 1958-1966. The degree of mechanization in the industry also increased considerably during the period, to a level matched only by textiles and the paper-printing industries. Utilization of the available stock, nevertheless was low, the lowest of all industries at the end of the period, reflecting the time lag required by newly established capacity to adjust to a better level of utilization as the local market and export possibilities were exploited. The factor shares moved in a somewhat erratic way for the few years we can collect information and the share of labour in income seems higher than in other capital good industries. The technology index itself was quite erratic, though it is very difficult to interpret movements over such short periods of time, particularly when dealing with newly-established sectors. Assuming constant factor prices, the bias in technical advance was capital saving in six out of eight cases (Table LXXVI). The average daily wage was also high, although not increasing at the rate of non-metallic minerals or metal products etc.(Table LXXVII).

Steel is traditionally considered the most important of all metal industries, a position successfully challenged in Greece by aluminium in the sixties. Greece could not of course hope to compete for innovation in raw-materials-use in steel-making, or in other steel-making innovations. The industry, nevertheless could play some part in innovations in shaping steel and in introducing new products, despite considerable competition from new materials such as aluminium, plastics, etc.(1) Despite this, out-

(1) Cf. American Iron and Steel Institute: The Competitive Challenge to Steel, 1963 Edition, pp. 11-17.

put in the iron and steel sectors was expected to increase at a satisfactory rate to cover local requirements and substitute for imports. Obviously the need was for integrated plants, but the first such plant was agreed to be built near the end of the period under consideration. Prior to this smelting crude ore and transforming the resulting pig-iron into cast-iron products and producing steel ingots was done with different possible technologies, not necessarily automated in the operation of the blast furnaces. The quality of production therefore, was variable. This nevertheless was something that with proper technical advice could be remedied to a considerable extent, as improvements in techniques could effect productivity-increases in old blast furnaces resulting in about one-third additional output with little additional investment.(1) Some plants in Greece nevertheless still had their open-hearth furnaces as it was not possible in the economic conditions of that time to scrap equipment which was still usable.

Steel ingots are treated in hot-rolling primary mills and further alloying develops high-grade steels.(2) The rolling mills is the most expensive single piece of plant in the works and expenditures were rising as rolling and finishing operations became more continuous and faster with the advance in automation. The rate of adaptation in Greece to new technical advances was slow in the use of pure ogygen to oxidize impurities in pig-iron, the introduction of oxygen converters. Bulk electric processes of steel-making, continuous casting and vacuum treatment were never introduced in this period.

The unit costs of labour were quite high, reflecting limitations imposed by the general shortage of qualified manpower in Greek industry.

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(1) U.N. I.D.O., Vienna: Iron and Steel Industry, Monograph No.5, New York, 1969, p. 12.

(2) Cf. British Iron and Steel Federation: The Steel Industry: The Stage I Report of the Development Co-ordinating Committee, Shenval Press, July 1966, p. 41 ff.

Demand for unskilled and semi-skilled workers (about four-fifths of all employees) was not changing, but skilled craftsmen, foremen, technical and professional experts were in short supply.

Foundry investments in new plant and equipment were also expected to increase, as the outlook for sales of castings to metal working and other industries was improving. Not enough interest was shown in that period in such foundry investments mainly because the machine tools and automobile industries had not yet got off the ground.(1) New equipment to be brought into the sector could therefore be expected to embody improvements in the molding machines, the materials-handling machinery, the electric melting furnaces, and the general process of casting and die-casting.(2)

The aluminium industry depends on the existence of bauxite deposits and on electricity as generating power. The available quantities of bauxite containing 55-60% Al_2O_3 , suitable to a large extent for the production of aluminium are estimated to over 60 m. tons, but more deposits were thought to have been found recently as negotiations for the establishment of a second huge aluminium and alumina factory were in progress. The need of large supplies of low-cost power was even more important, with the existing aluminium factory consuming about 830 m. K/H and an expanding nickel factory an additional 400 m. K/H at least. More use of hydroelectric power and of domestic-lignite-powered thermo-electric units had to be planned to meet the demand at an acceptable price. Above all the capital requirements of the industry were considerable, with larger units having an advantage, and big international companies are dominating with their subsidiaries the world market. Greece did not have the large-scale regular network of aluminium-using industries, so that a large share of the product was going to export markets, sometimes at prices determined

(1) The shipbuilding industry was also going to benefit from such an expansion in foundry investments.
(2) Cf. Leonard W. Weiss: Case Studies in American Industry, John Wiley, New York, 1967, p. 196 ff.

at oligopsony conditions.[1] Greek production of alumina in 1966 was 72,900 metric tons (which in five years increased by more than six times) and that of primary aluminium was 36,200 tons (which increased by three times in the five years that followed).

In addition to the capital, bauxite and electricity inputs the industry requires fluorine content of sodium-aluminium fluorines (25 to 35 kg per ton of metal) and carbon for anodes (450 to 560 kg per ton of metal). The labour input requirements in the aluminium industry are very variable, as the degree of automation was more or less dictated by the kind of capital outlays on equipment.[2] The conditions of the labour market would therefore ultimately determine the degree of automation that is economically desirable.

SELECTED MAJOR FOREIGN INVESTMENTS

1960-1965	£ 58 750 000	Aluminium
1963-1965	£ 1 000 000	Steel - Nickel
1964	£ 334 300	Copper - Brass
1965	£ 500 000	Aluminium - Copper
1966	£ 57 250 000	Aluminium

Source : See note under foreign investments in food industries above.

The bulk of foreign investment came in the last third of our period and was concentrated in a few large firms. Despite the enormous and obvious importance of the aluminium industry, particularly as an exporting activity (with only 10,800 tons consumed out of 36,200 produced in the year 1966)[3], it is the belief of this author that with the projected expansion in metalworking and automotive industries, the sector in demand for foreign-technology inputs and know-how at a high level (coming not as a package deal as in the case of the aluminium industry but on an individual activity basis) was the foundry industry. This development would change the structure of the small non-competi-

(1) O.E.C.D.: Problems and Prospects of the Primary Aluminium Industry, Paris, 1973, p. 43.
(2) U.N. I.D.O., Vienna: Non-Ferrous Metals Industry, Monograph No.1, New York, 1969, p. 40.
(3) By 1971, 20,000 tons were consumed, out of a production of 111,000 tons (150,000 tons capacity).

tive firms producing low quality castings in small lots and would help introduce new patterns and adapt to automated mould handling. An inevitable displacement of inefficient, small units could be expected as the more mechanized producers would redesign parts previously produced by welding, forging or stamping, as castings, despite the increasing competition of plastics in the place of diecastings. Greater use of electric furnaces as primary melters and as refining units would have to come with the introduction of batch type melting. Only then an expansion in the steel industry could be expected to bring about a transformation in the engineering and metal-working industries which form the hard core of a modern industrial nation.

I. The Metal Products - Machinery - Electr.Equipment Industry

The metal products etc. industry in contrast to other capital goods industries showed an increase in the Q/K ratio in the period 1958-66 (Table LXX). The increase in net capital stock was the smallest of sectors with the exception of paper-printing and the miscellaneous industries. This deficiency in the stock of capital can not be attributed to depreciation structures, as the industry is not particularly highly mechanized and the share of quickly depreciating machines in all stock is not high (Table LIII). The degree of utilization of the stock, although not very high was more or less even, with the exception of the last two years, when a more considerable drop is observed (Table LXVIII). The share of capital in income was rather higher than in some industries, although not as high as in textiles or transport equipment or miscellaneous industries which have (in reverse order) the highest rates. The residual factor index increased to the second highest level after the chemicals, with one little slump only in 1961, the same year incidentally when the chemicals index had a similar decline.

The deficiency in capital outlays in this sector can partly be explained by the profusion of different engineering products and electrical industries components that constitute the output of the sector. This diversity brings about a difficulty in programming such multitude of interdependent activities and in achieving economies of scale. Single metal products and domestic utensils of low-grade steel and old-vintage-machine requirements were manufactured in the fifties in Greece. The manufacture of machines in simple varieties was introduced in those sectors where similar activities were operative in an elementary level even before the war, with some prominence given to production of replacement parts for equipment and machinery to substitute for imports. Manufacture of agricultural equipment was resumed after the end of the civil strife, but

diversification of production for the manufacture of industrial equipment and machinery has hampered by the lack of sophistication of indigenous technology. With limited combined production of all various workpieces, operations in a typical shop had to be switched from one product to another, with all the delays and retooling expenses involved : the length of standardised production was generally very small. Unutilized capacity and increasing capital costs of equipment relative to productivity were the main feature of the small-scale over-all operations.

And yet linking together components incorporated in various products of varying sophistication is not impossible in engineering products, if the design tolerances are small enough. Production oportunities then for the construction of components would seem encouraging.(1) This nevertheless would require different metal-cutting machine tools, casting shops, forges, assembly-line types and processes than were available in Greece in the fifties. With capital outlays falling short of the industry average (in terms of rates of increase) this sector could not have a major choice of product lines or variants of processes when planning for expansion. The production of low-quality raw materials (steel etc.) also brought adverse effects in production.(2)

The creation of advanced labour skills in this sector was a step forward for the introduction at a later stage of automated techniques and great importance is given in many countries to the additional skills and to technical advances, to avoid "technological dependence". The engineering industry helps the training of labour force and advances cultural change with improvements that influence all sectors of the economy. Nowhere is this more obvious than in the case of the machine tools sector.

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(1) Cf. U.N. I.D.O., Vienna: Engineering Industry, Monograph No.4, New York, 1969, p. 26 ff.
Donald A. Schon: Technology and Change. Delacorte Press, New York, 1967, p. 151 ff.

(2) The proportion of output of the sector on total manufacturing outputs actually declined in the 1960-1966 period (see Table a most deplorable development.

The importance of the machine tools sector lies with the fact that nearly all articles are manufactured by machine tools or by equipment constructed by such tools.(1) Parts of several machine tools were manufactured in Greece, some under licence. A few were exported to be finished by joint ventures abroad, although transport costs obviously kept such ventures to a minimum. An expansion in tool industry would obviously be reflected in the methods and products of other industries, with new and more efficient ways of cutting and forming metal.(2) The introduction of carbide tools for greater durability was withheld not only by the backwardness of precision engineering, but also by the unavailability of an advanced basic metals industry to provide the necessary high-quality metals.

In Greece engineering concerns often simply engaged in mere finishing operations, of the "screwdriver industry" type, such as assembling engine parts or other equipment. There existed a large number of small plants making a number of consumer goods, such as domestic utensils, window frames and metal furniture, or other industrial products as metal drums and tanks, building components, etc. There was no need of course to manufacture the entire range of metalworking products, but at least those of the highest value-added with a technology within the limits of the Greek industrial potential could be manufactured in compliance with domestic needs. This was not the case, unfortunately in the fifties and early sixties, as it required a quick expansion of the capital base to achieve it (which was not forthcoming) and of course a number of agreements for designs by and technical collaboration with foreign technology. This contrasted with neighbouring Bulgaria and Yugoslavia which both had brought about a very considerable expansion in such activities (3)

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(1) M.E. Beesley and G.W. Troup: "The Machine Tool Industry", D.Burn, Ed., Op. cit., Vol.I, 1961, p. 362.

(2) U.N. I.D.O., Vienna: Regional Seminar on Machine Tools in Developing Countries of Europe and the Middle East, Varna, Bulgaria, 1971, New York, 1972, p. 38.

(3) U.N. I.D.O., Vienna: Report of the Interregional Symposium on Metalworking Industries in Developing Countries, New York, 1968, pp. 21-22.

The domestic electrical appliances sector generally produced apparatus for generating and transmitting electricity. It is the kind of industry where large firms may show a certain inflexibility of production, when medium-sized firms are often more efficient than many of their large competitors.(1) The industry produces large motors, line generators, power transformers, switchgear, rectifiers, electric furnaces, etc. and requires considerable investment in testing facilities. The technology is directed towards the reduction of electrical losses and towards compact sizes. Although not a particularly capital-intensive industry, it had a long production cycle (very long production periods) and therefore the working capital requirements were heavier than normal, with substantial funds tied-up.(2) Large underutilized capacity was also not infrequent. Product improvements continued to provide new markets, but capital expenditure for new plant and equipment was rising steadily. The industry in a country like Greece could not get started without the assistance of international technology, given the sophistication of industrial know-how in this branch. With the high initial operating losses and the low rate of turnover of capital associated with such activities, it is not surprising that the expansion was slow.

In the electronics sector there is an intimate connection of the industrial processes with academic science. The end products are either domestic or industrial. In advanced technologies much of the defence equipment is linked to the electronics industry, but this of course requires a degree of technological sophistication far in advance of the mediocre structure and limited means of the small Greek firms. And yet small firms in some advanced countries have often enjoyed a lead in electronics and are as efficient as their very large competitors. In mass production we have a high proportion of women assemblers, and the general trend is for chemical and metallurgical processing to replace mechanical manufacturing and assembly.

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(1) T.A.B. Corley: Domestic Electrical Appliances, Studies in British Industry No.1, J.Cape, London, 1966, p. 105 ff.

(2) Ayhan Cilingiroglu: Manufacture of Heavy Electrical Equipment in Developing Countries, International Bank for Reconstruction and Development, J.Hopkins, Baltimore, 1969, p. 10 ff.

SELECTED MAJOR FOREIGN INVESTMENTS

1957	$ 210 000	Metal Structures
1957-1965	$ 2 930 000	Electric Wires
1958	$ 127 725	Steel Bottles - Containers
1959	$ 159 644	Grinding Tools
1959-1963	$ 420 000	Steel Gas Bottles
1960-1961	$ 1 100 000	Radios - Records
1963	$ 700 000	Electronics
1963	$ 113 000	Precision Tools
1963	$ 537 450	Cuttlery etc.
1963	$ 150 000	Batteries
1964	$ 1 733 200	Metal Boxes - Containers
1965	$ 180 000	Electronics
1966	$ 1 000 000	Steel Wires

Source : See note under foreign investments in food industries above.

Foreign investment in this group of activities came in an unspectacular way at a rather low level and the rate of increase of the inflow relative to domestic investment had practically leveled off after 1961. Significantly no major investment was undertaken by foreign concerns for the production of machinery. Most of the existing units started as maintenance job-plants to repair and produced more or less unsophisticated spares. Eventually plants were established, some of which developed into average-sized factories, of either the metal-transforming or the product-assembly type. The products were not particularly sophisticated or complex and little design work was carried on. The policy of turning out simple products for an established and expanding home market was the result of the low engineering and technological level: products not suitable for exports. Foreign technological advice was then required mainly to stop the industry growing up in a haphazard fashion and to channel its development on a step-by-step expansion process, starting from the least complex products and working upwards, substituting for imports and gradually competing with foreign goods and beginning to export. Foreign expertise was therefore necessary in this branch to help in setting up priorities on a sound interindustry relations basis, taking account of the relative degree of technological sophistication or backwardness in each individual case.

J. The Transport Equipment Industry

The transport equipment industry had a very considerable increase in output during the period 1953-1966, accompanied by the largest increase in capital stock. The Q/K ratio fell considerably in the 1958-1966 period (Table LXX) and the degree of mechanization showed a small increase. This remained the less mechanized of all industries by a wide margin and this is attributed to the high "plant" expenditures in setting up shipyards. Utilization of the stock was a little higher than in basic metal industries although still at a rather low level (Table LXVIII). The share of capital in the distribution of income was one of the highest in the industry, surpassed only by that in miscellaneous industries and the early years of chemicals (Table LXVI). Derivation of a residual factor for such a short period of time as in this industry (data for five years only) poses significan problems in interpratation, but note the smoothly increasing trend in contrast to the wide fluctuations in a similar index in the basic metal industries (Table LXXI). The technical advance contains a strong consistent labour saving bias throughout the period (Table LXXVI). The average daily basic wages also increased spectacularly in this branch (Table LXXVII). This was the sector with the youngest average age of capital stock (see "newness of stock" index, Table LXXIV).

"Transport equipment" covers a wide range of manufacturing activities, including the construction of passenger cars, vans, lorries, buses, pickups, trailers, commercial vehicles, tractors, motorcycles, railroad equipment and rolling stock, shipbuilding and ship repairing. Not all those activities were carried on in Greece, with the exception of shipbuilding and the construction of tractors and bus bodies (one should include motorcar repairs in this list). The small size of the domestic market for passenger cars precluded the establishment of an assembly line of standard motorcars. Neither were any motorcycles or bicycles made. No aircraft or other com-

ponents of the aerospace industry with its high technology inputs were ever made in Greece. There was, nevertheless, a potential market developing for the partial construction and assembly of some types of cars and this led after the end of the period to agreements with French and German firms for the development of such activities.

An international firm is obviously better qualified to provide the know-how and technology required for the operations of a large industry in this group. Production here is characterised by the vast range of components and parts, the diverse standards and complex specifications and the need of mechanisation and automation to a high degree.(1) The difficulties, nevertheless, in establishing such industries in Greece was not simply with the low product standards of that period or the unavailability of many basic materials (with the accompanying substandard specification and uniformity) but also with the unavailability of supplier industries and specialised subsidiaries. The adaptation of production techniques to local plant engineering standards in terms of quality and production cost could not be met in Greece in the period before 1966, nor was it contemplated to start initial procedures and improvise adjustments before an expansion of the technological infrastructure and of incomes to create the necessary demand made this operation economically viable.

The importance of transport technology(2) was fully accepted in Greece during this period, but it was believed that shipbuilding and ship-repairing alone could develop quickly and expand to have a favourable impact on industrial employment and the country's balance of payments. The technological problems in such a development were still considerable, but the industry could obviously take advantage of cheap steel. Some

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(1) Jack Baranson: Automotive Industries in Developing Countries, World Bank Staff Occasional Papers No.8, International Bank for Reconstruction and Development, J.Hopkins, Baltimore, 1969, p. 17 ff.
U.N. I.D.O., Vienna: The Motor Vehicle Industry, New York, 1972, p. 70.

(2) Wilfred Owen: "Transport and Technology", G.Fromm, Ed., Transport Investment and Economic Development, Transport Reseach Program, The Brookings Institution, Washington, D.C., p. 69 ff.
U.N. I.D.O., Vienna: Establishment and Development of Automotive Industries in Developing Countries, New York, 1970, p. 25 ff.

of the more important problems are simplified by use of prefabrication and welding, as vessels are designed to much more precise specifications.(1) The personnel requirements (technical and supervisory) of such preplanning are quite considerable for a country of low standards of technical education. Another problem is that of installing a marine engineering industry, as shipbuilders in Greece and elsewhere(2) do not make engines for their own ships any longer and the engine works have become independent of shipbuilding operations. It would require a very considerable advance in the Greek engineering industry to undertake construction of larger engines, but smaller units (although not made in the period before 1966, except some very small ones) could expect to have a sufficient market and adequate technology in the forseeable future for such an expansion. The importance of naval shipbuilding and repairing for destroyers, frigates, mine layers, etc., is very large both in terms of earning and saving foreign exchange and in terms of creating new employment and technologies,(3) but the prospects of such developments were even more remote than those in the field of marine engineering. Innovations in design, hull form construction, cargo handling and to a lesser extent in automation, remote control and engine control were within the range and capabilities of the industry, aiming to decrease the cost of ships and to reduce the operational expenses.(4) In this respect the quality of outfitting work, done after the ship's launching had to be improved.

Another important problem of shipbuilding concerns the regularity of demand for ships over time, as the industry as a whole is subject to violent fluctuations, potentially more damaging than a low level of utilised capacity.

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(1) Cf. Leslie Jones: Shipbuilding in Britain. University of Wales, Cardiff, 1957, p. 228.
(2) W.E. Coe: The Engineering Industry of the North of Ireland, David and Charles, Newton Abbot, 1969, p. 96.
(3) P.W. Clarke and B.D. Costello: The Shipbuilding Industry, Hoare and Co., Investment Research, London, 1966, p. 70.
(4) Japan Ship Exporter's Association: Japanese Shipbuilding: A Growing Giant, Shiba-Kotohira-cho, Minato-ku, Tokyo, p. 29 ff.

The demand for new ships tends to be price inelastic and the level of anticipated earnings conditions the timing of new orders.(1) Conditions in the freight market and fluctuations of rates are accordingly transmitted to and amplified in a shipyard. But as the sensitivity to steel and aluminium price increases, the benefits of expanding modern basic metal industries in Greece were going to be an advantage to shipbuilding.

SELECTED MAJOR FOREIGN INVESTMENTS

1957-1958	$ 238 900	Car (Bus etc.) Bodies - Coachbuilding
1958-1959	$ 165 850	Car etc. Bodies
1959	$ 1 120 000	Shipbuilding
1959-1965	$ 26 950 000	Shipbuilding
1962	$ 108 000	Car etc. Bodies
1963	$ 1 055 000	Three-Wheel Cars
1963-1966	$ 323 265	Ship Repairs
1966	$ 162 925	Bus - Lorry Bodies

Source : See note under foreign investments in food industries above.

The importance of shipbuilding in the Greek manufacturing industry has increased with a number of large investments after 1966 and the overall effect was amplified by the high interindustry relations of this branch with the basic metal and engineering industries. This is easily the activity with the greatest expansion potential in the Greek industry. The expansion, nevertheless, would undoubtedly by constrained by the deficient structure (and the inevitable slow transformation) of the engineering and electronic equipment industries. To the expansion of those two then should foreign technology inputs be directed in the initial period. The motor industry would inevitably have to be linked with a specific foreign manufacturer, who would bring in technology and investment in a package deal.

(1) Commission of the European Communities: Report on the Long and Medium Term Development of the Shipbuilding Market, EEC Shipbuilding Liaison Committee, Working Group No.1, 1972, p. 149 ff.

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Individual Greek bibliography references are not cited in this chapter, as little exists in terms of systematic treatment of the subject. Most of the information was collected by the author mainly in newspaper and periodical clippings over a long period of time and the diversity of such circumstantial evidence does not warrant special reference to the original context. Some sources nevertheless have provided valuable insight into the problems and the set-up of the industries and are given below for general background information.

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CHAPTER TWELVE

An Appraisal : Outlook for Change

I. This is a study in development economics. The manufacturing industry in Greece in the years before 1966, reveals many of the symptoms of structural inadequacies which characterize countries at that stage of advancement. One such characteristic is the reliance on foreign capital and expertise in taking up investment possibilities in an expanding market. It is in the light of such a continuing and increasing flow of foreign capital that a number of important aspects of the manufacturing industry in the period 1953–1966 have been studied.

The originality of this work rests with the application of an analytical level of inquiry not previously employed in the context of the Greek industry. One important feature of the work is the level of disaggregation, which allows for sectoral comparisons not otherwise possible at a higher level of aggregation. As little background information existed detailed or reliable enough to allow for a framework in the analysis of the effects of this inflow of foreign capital, much original work was done in developing and presenting such original material. The areas that this research covered are the following :

1. The calculation of the level of inflow of foreign capital by sector of the manufacturing industry (Table XV and Appendix to Chapter Four, Para. C.).

2. Estimation of outflows of funds on long term foreign capital investments by sector of the industry, from unpublished data at the Bank of Greece.

3. In a major statistical undertaking estimates of imports and exports of manufactured commodities by producing sector were calculated from detailed National Statistical Service data (Appendix to Chapter Six and Tables XIX and XXXVIII).

4. Estimates of Gross Import Substitution (Table XXI), Net Import Substitution (Table XXII) and Import Replacement (Table XXIII) were made by sector of the industry.

5. Backward- and Forward-Linkage Effects were calculated (Table

XXV), together with Backward-Variability and Forward-Variability ratios (Tables XXVIII and XXIX), from the existing 1960 input-output table of the economy, adjusted to a more suitable level of aggregation (Table XXIV). Furthermore the same estimates were made this time excluding the import content of interindustry flows (Tables XXX to XXXV), in an effort to determine "key" industries for expansion and to see what kind of industries foreign capital was attracted to (Table XXXVI).

6. Incremental C/O ratios were developed (Table XXXVII) and used in estimating total import coefficients (Tables XXXIX to XLI), so that the level of imports indirectly generated by the inflow of foreign capital could be calculated. To expand the system in years before or after 1960 (the input-output table year) a system was devised utilising an unchanging interindustry structure (as given by the lone 1960 input-output table) together with a changing import content, to obtain results of greater accuracy as far as the available information allows.

7. Further original research was done in calculating annual capital and labour inputs into the manufacturing industry by sector. The lengthy computations for an estimate of gross capital formation (Chapter Nine, Para. B) and its allocation into land + buildings, transport equipment + furniture + fittings, and mechanical equipment, were followed by a calculation of an appropriately depreciated net capital stock estimate (Table LVII).

8. Calculation of profits (based on Federation of Greek Industries data - Tables LIX, LX and p. 178 in text) and profits (based on National Statistical Service data - Tables LXI to LXIV) allows an estimate of factor shares in income distribution.

9. Using capital stock estimates adjusted for underutilization of capacity, aggregate production functions were computed and an index of residual factor values was constructed (Table LXXI).

10. Foreign investment was then linked to the evidence of shifts in the production function, to developments in employment and to the requirements of a changing technological structure by sector of the industry.

II. The results obtained can be summarised as on Appendix Chart to Chapter Twelve. In constructing this chart we try to bring forward several factors examined in this thesis, which will help a synthetic evaluation of the effects of foreign investment and of the relative performance of the various sectors of the industry.

Certain assumptions are made in this context to determine the relative positioning of the sectors. Namely it is assumed desirable that the level of unutilized capacity be reduced, that changes in income distribution should favour (on a socio-economic basis) increased shares of labour in income, that the factor-saving bias in technological advance should be labour-saving (in view of the shortage of qualified manpower in Greece and the arguments in Chapter Ten, Para. F. above), and that the residual factor index should be increasing for higher unit cost savings in production due to technological change. Furthermore, high backward and forward linkage effects and low variability ratios are desirable, although it did not seem appropriate (as in some other studies) to give a weight of two-to-one to backward-linkage effects over the forward ones. One could simply keep in mind the greater importance of backward-linkages in a developing economy. From the balance of payments point of view a high inflow with low outflow is desirable[1] and so are high import substitution estimates coupled with low total import coefficients.

The evidence confirms the importance of branch 29-32 (chemicals etc.) as the most vigorous and dynamic sector in the industry. Food industries (20-22) follow and then textiles (23) with non-metallic minerals (33). The most disappointing feature of our results is the general low standing of the metal products - machinery sector (35-37) whose development is considered one of the indispensable preconditions of a successful industrialization policy. An expansion there would obviously be beneficial in view of the additional feature of very high residual (technology) index. Perhaps this branch, as well as transport equipment were held down by very low backward linkages, which would obviously improve with the anticipated improvement in the basic metal industries.

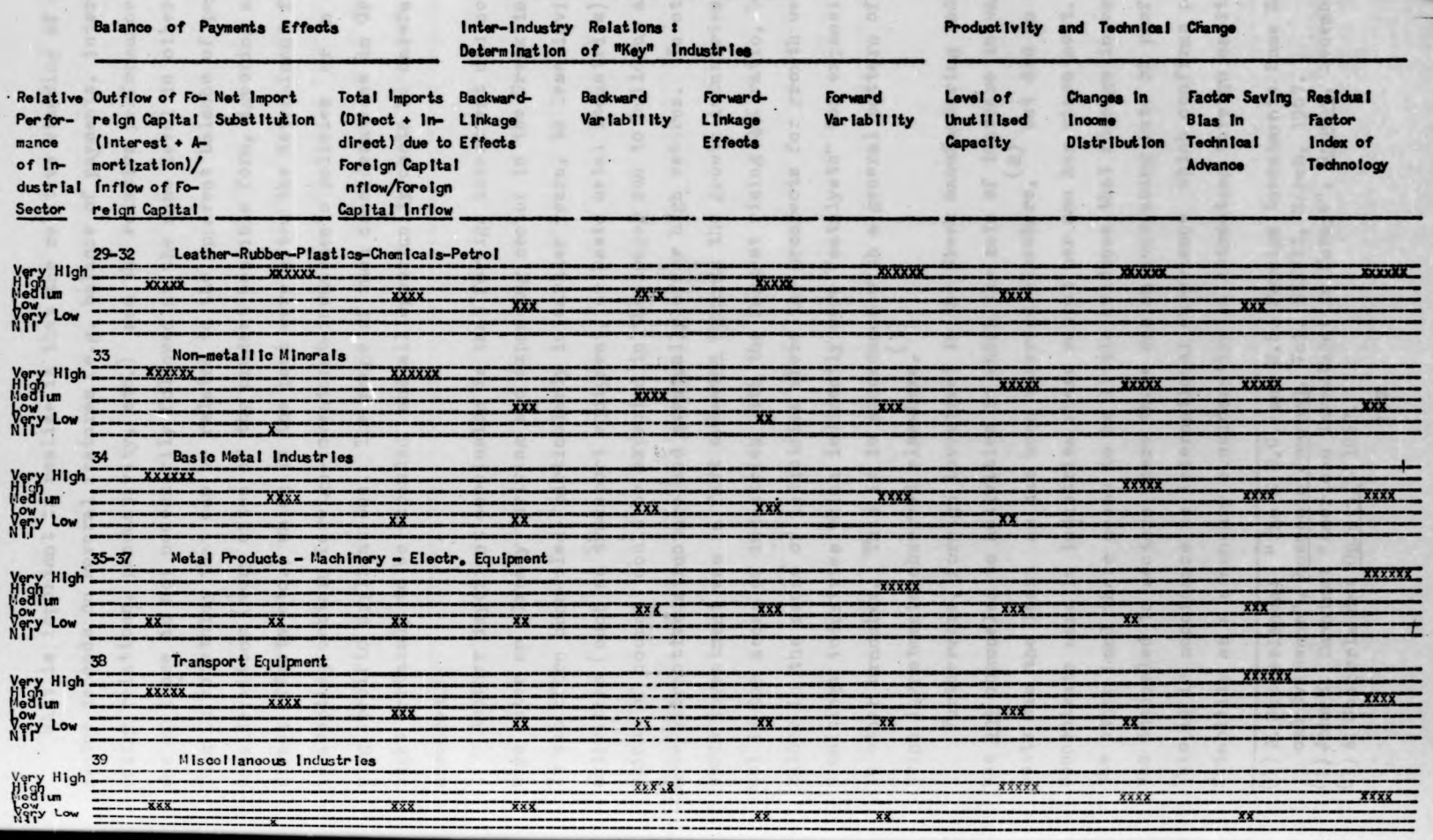
(1) But on this point also see the second paragraph in p. 293 below.

APPENDIX CHART TO CHAPTER TWELVE

Evaluation of Relative Economic Performance of the Sectors of Industry

Relative Performance of Industrial Sector	Balance of Payments Effects: Outflow of Foreign Capital (Interest + Amortization)/ Inflow of Foreign Capital	Balance of Payments Effects: Net Import Substitution	Balance of Payments Effects: Total Imports (Direct + Indirect) due to Foreign Capital Inflow/Foreign Capital Inflow	Inter-Industry Relations: Determination of "Key" Industries: Backward-Linkage Effects	Inter-Industry Relations: Determination of "Key" Industries: Backward Variability	Inter-Industry Relations: Determination of "Key" Industries: Forward-Linkage Effects	Inter-Industry Relations: Determination of "Key" Industries: Forward Variability	Productivity and Technical Change: Level of Unutilised Capacity	Productivity and Technical Change: Changes in Income Distribution	Productivity and Technical Change: Factor Saving Bias in Technical Advance	Productivity and Technical Change: Residual Factor Index of Technology
20-22 Food-Drink-Tobacco											
Very High			XXXXXX					XXXXX		XXXXX	
High											
Medium	XXXX	XXXX		XXXX	XX	XXX	XXX		XXX		XXX
Low											
Very Low											
Nil											
23 Textiles											
Very High											
High			XXXXX								
Medium				XXXX		XXXX	XXXX	XXXX			XXXX
Low		XXX							XXX	XXX	
Very Low	XX				XX						
Nil											
24 Clothing-Footwear											
Very High											
High			XXXXX		XXXXX						
Medium				XXXX				XXXX		XXXX	
Low									XXX		
Very Low	XX					XX	XX				XX
Nil		X									
25-26 Wood-Cork-Furniture											
Very High											
High											XXXXX
Medium	XXXX			XXX	XXX	XXX	XXX		XXX	XXXX	
Low											
Very Low			XX					XX			
Nil		X									
27-28 Paper-Printing											
Very High									XXXXXX		
High											XXXXX
Medium	XXXX	XXXX	XXXX	XXX		XXX	XXX	XXXX			
Low										XX	

APPENDIX CHART TO CHAPTER TWELVE (Continued)



What is important to realise is that the relative standing of a sector depends on several features (e.g. balance of payments, inter-industry relations, productivity, etc.) and the relative performance in one of those is not necessarily followed at the same level in others. This is something that can be related to the apparent balance of payments considerations (very often of the crudest possible form, ignoring all indirect effects etc.) which in the past were often the determinant factor in adopting certain foreign-investment-inducements policies or in approving specific applications. The range of such considerations in Greece ought certainly to be expanded and all opportunity costs be carefully assessed.

Another important conclusion is that foreign investment did not always enter an already thriving and expanding sector in the Greek industry. It was often channeled, particularly in earlier years, to less inviting activities (such as transport equipment, or basic metal industries), which of course could be expected in the longer run to build up a more attractive structure and eventually offer high returns. In other words investment was in fact oriented towards the growth industries, not in the sense of industries with the fastest rising Q/K ratio, but rather in the sense of industries where the prospects for growth were promising: industries which indirectly were "catalysts" for expansion in other branches. This is in accordance with a general pattern of foreign investments observed elsewhere.(1)

Furthermore, foreign investment in the Greek manufacturing industry was <u>not</u> channeled to activities in which the rate of increase in wage costs was the least as has been observed elsewhere,(2) but did in fact concentrate more in industries where output per man has risen most. On the other hand there seems to be little evidence that foreign investment was channeled to sectors where there was an increasing rate of profits. This is in accordance to international experience which confirms profitability as a secondary consideration in attracting foreign capital.(3)

(1) A. Scaperlanda: "The E.E.C. and U.S. Foreign Investment: Some Empirical Evidence", <u>Economic Journal</u>. Vol. LXXVII, March, 1967.
(2) John H. Dunning: "American Investment in Europe", <u>Aspect</u>. December, 1963.
(3) A. Scaperlanda: <u>Op.cit.</u>, 1967.

We note, nevertheless, that the evidence on profits in Greece relates to the entire sector not only to the foreign-owned part of it, so that until further information is made available on the relative profitability of foreign concerns, our conclusions in this direction are only tentative. I should mention though that the reliability of such evidence on the profitability of foreign concerns would inevitably be questioned in the light of the alleged tax avoidance from the part of foreign investors. Although little hard evidence exists in specific instances, the method employed is rather well known: foreign firms simply use artificial pricing between the Greek subsidiary and the overseas parent company to eliminate high profits or even to create theoretical tax losses. Clauses of reference to international commodity price levels should be negotiated to safeguard the fiscus from such frauds before the profit levels declared become meaningful.

As to the effects of foreign investment on technological change discussed in chapter ten, para. E, it should be stressed that in most branches of the industry the level of foreign investment before 1966 was still quite low and there exist so many other determinants of growth and technological advancement. Even so, the potential capacity of the "technological multiplier" (1) in bringing about important technological and competitive spillover effects on the output of suppliers and competitors should always be given careful consideration.

(1) J.B. Quinn: "Scientific and Technological Strategy at the National and Major Enterprise Level", U.N.E.S.C.O. Symposium, The Role of Science and Technology in Economic Development. Paris, 1968.

III. The change in the structure of production and the advancement in economic organization in the manufacturing industry of Greece is reflected in the considerable changes in gross domestic product:

	% of Total		% Change	Average Annual Rate
	1960	1966	1966/1960	1960-1966
20-22	22.6	21.5	57.3	7.8
23	16.7	15.0	48.7	6.8
24	13.5	11.0	35.5	5.2
25-26	6.0	4.7	29.0	4.3
27-28	4.2	4.8	89.9	11.3
29-32	10.3	12.1	94.7	11.7
33	6.5	7.9	102.0	12.5
34	2.1	4.6	265.1	24.1
35-37	12.9	12.6	61.3	8.3
38	2.7	3.3	99.5	12.2
39	2.5	2.5	67.0	8.9
	100.0	100.0	65.6	8.8

Note : At constant 1958 prices.
Source: Ministry of Coordination: National Accounts, 1960-1966, No. 17, Athens, 1968, p.11.

Despite this impressive rise, the rate of growth of capital formation in Greece in the period 1953-1966 is generally seen to have been low relative to the rate of growth of demand (see p. 35 in text above). It is not surprising therefore that a substantial part of the capital equipment in the industry continued to operate in production long after its life expectation had expired: machinery and equipment in much of the industry was not scrapped as quickly as one could expect. This had an effect on productivity, but also had an effect on the technological structure of the industry. Sales of second-hand equipment and machinery were rare and the transfers of technology from larger to smaller concerns were infrequent. Those new firms that had the means could only acquire practically all their equipment new from abroad. This tended to discourage the diffusion of technology from the Greek side.

Foreign firms, on the other hand, were mainly large- or medium-sized by Greek standards and whilst they generally made longer-term plans (on a basis unequalled by their Greek competitors), they also tended to transfer rather standardized technology, to be applied with little or no adaptation so as to minimize costs. Much of this technology did not permeate the industry to any great extent, as the Greek firms were mainly try-

ing to adapt components of foreign technologies to achieve particular price/quality combinations better suited for the Greek market than the product quality of the parent firms that foreign investors were often trying to match. The technology orientation of many foreign investors left their Greek counterparts in the industry simply uninterested.

A more educated government approach was nevertheless felt to be necessary in screening applications for investment. The high priority given to direct balance of payments considerations in determining the desirability of such investment has already been mentioned and should be revised to include considerations such as those given in the previous paragraph II. For instance with a growing component of foreign undertakings increasingly financed internally by local borrowing, retention of profits or depreciation, it is necessary to discriminate as to the source of finance of the foreign concern, so that some of the benefits allowed for the foreign-financed parts of it do not accrue to the locally-financed production components. This would involve a re-evaluation of the first column in the Appendix Chart in the previous paragraph II, and would undoubtedly be something very difficult to quantify and to negotiate with the foreign investors.

Some further thought should also be given to non-import-substituting (or non-exporting) firms which are likely to replace or compete with other Greek output and to such firms which make only a small proportion of purchases in Greece (creating therefore at the same time fewer incomes through the multiplier effects and a deterioration in the import bill).

Above all the government should restrict imports of capital unaccompanied by technology. This particularly applies to foreign investments in resource exploitation and distributive outlets. Such concessions (including the two largest foreign investments of the period : Pechiney aluminium with an exploitation of bauxite resources and electricity supplies, and ESSO with a chain of distributive agencies for their products throughout the country)should be reconsidered and renegotiated wherever possible. Foreign investment should increasingly be considered as a special concession for the import of technology not of foreign exchange.

Small firms should be encouraged to import not only small individual components of technology, like pre-investment or problem-saving devices, pattents, etc., but also to bring experts and employment consultants from abroad, to train personnel abroad, to bring in more comprehensive combinations of know-how and to make foreign technical litterature available to their employees. Firms should try and minimise risks by obtaining performance and output guarantees, with licences warranting the quality of the product and helping in setting up procedures of production in "product technologies" involving important durable equipment (machinery, electrical equipment, motorcars, instrument industries). In "process technologies" such as chemicals, pharmaceuticals or steel, the problem-solving services, plant construction and other production know-how are often more important than licences, so that there may be less scope for foreign investments here, than in "product technologies". Such process technologies as the consumer goods absorbing an ever increasing proportion of earned incomes in the country as the standard of living rises (such as packaged foods, domestic electrical appliances, cosmetics, etc.) should be developed by Greek firms and foreign competitors should be discouraged. Capital goods on the other hand, with substantial research and development content, would necessarily have to have foreign competitors attracted in Greek production, but with a simultaneous effort at the first stage to create an environment that would help diffuse the benefits of technology throughout the economy. Only then such foreign firms could be controlled in the light of Greece's best interests through the use of the tax system, as indeed should firms in resource exploitation and distributive outlets. Accordingly majority foreign ownership should be allowed only if the technology that comes with it is unobtainable otherwise. If such technology is made available otherwise, foreign investment should be channeled into a joint venture with a Greek firm or be discouraged.

In Greece during the period 1953-1966 and even after that few firms would undertake to do any research and development work. It is true that this stage of industrial development seems to depend a lot more on the capacity to draw upon existing scientific knowledge, wherever it may have

been generated, than on the capacity to contribute to that knowledge.[1] Whilst trying to overcome the dependence on balance of payments considerations Greek manufacturing industry should also try to avoid the even more odious status of technological dependence. Surely no one would like to see Greece entirely parasitic on foreign expertise, with indigenous research stifled. The right kind of advanced technologies from abroad should be attracted to the Greek manufacturing industry, not necessarily through the vehicle of foreign investment, with the right emphasis on social innovations to cope with improved education and training of young persons at home and more adequate provisions for general welfare. Greek technology could then be induced to evolve and even to rival foreign expertise in promoting productivity and industrial efficiency for the benefit of the Greek people.

(1) Raymond Vernon: Quoted in The O.E.C.I. Observer, April, 1968, p. 23.

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